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ABSTRACT

These proceedings contain 27 papers developed for a conference at which information was provided on currently available and future technological alternatives for delivery of career information. The presentations by staff of State Occupational Information Coordinating Committees, Career Information Delivery Systems, and hardware vendors are grouped according to the categories of alternatives discussed. The four presentations on automated alternatives cover batch processing, mainframes, telephone linking, and new distributed processing approaches. The next five papers focus on nonautomated alternatives: needlesort, the SCAN process, microfiche, telephone hot lines, and printed materials. Career information delivery through microcomputer use is addressed in seven papers that consider microcomputer delivery in Kansas; the move from a centralized system in Washington; microcomputer capabilities and costs; microcomputer effects on education; TRS-80 computers; and Winchester drives. The four presentations on special programs cover talking computers for the visually impaired; computer adaptations for braille and bilingual; Project Discovery, a guidance-based, simulated work, career educational system; and Systems Exploration and Research for Career Help (Search). The last seven presentations consider the use of a combination of alternatives to deliver career information in Iowa, Colorado, Georgia, Oregon, Maine, Florida, and Wisconsin. (YLB)

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Technology for CAREER INFORMATION DELIVERY

Conference Proceedings
Columbus, Ohio • February 18-20, 1981

Edited by
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Joan C. Blank

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FOREWORD

Providing current and accurate career and labor market information is an important task. The technological alternatives and strategies for delivering this information are increasing as new technical capabilities are discovered and refined. The successful use of available alternatives is the focus of this document. During a national conference, current and future alternatives for delivering career information were presented. This document contains the proceedings of that conference.

The National Academy for Vocational Education received funding from the National Governors' Association to conduct the conference and prepare this document. The National Governors' Association is under contract with the National Occupational Information Coordinating Committee to provide technical assistance to Career Information Delivery Systems staffs across the country as they establish their programs.

The planning and conducting of the conference plus the writing and editing of this document involved many people. Major contributions were provided by the following individuals:

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Selected State Occupational Information Coordinating Committee/Career Information Delivery System (SOICC/CIDS) staff and product vendors gave presentations at the conference. Their names are listed in the table of contents.

The National Center extends appreciation to the above people for their contributions to the success of the conference and this document.

Robert E. Taylor
Executive Director
The National Center for Research
in Vocational Education

Robert Alexander
CIDS Project Director
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INTRODUCTION

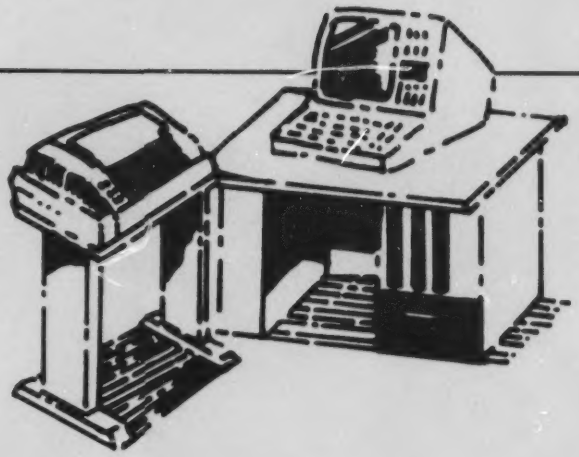
The National Occupational Information Coordinating Committee (NOICC) is in the process of funding Career Information Delivery Systems (CIDS) in various states across the country. In an attempt to aid the CIDS, NOICC has contracted with the National Governors' Association to provide technical assistance to the CIDS as they become established. Some of this assistance has taken the form of national workshops and conferences. The conference titled Technological Alternatives for the Delivery of Career Information was a part of this series. The National Governors' Association subcontracted with the National Academy for Vocational Education at the National Center for Research in Vocational Education to plan and conduct the conference.

The major purposes of the conference were to provide information on currently available technological alternatives and to present some alternatives that are on the horizon. These purposes were accomplished by having staff of selected State Occupational Information Coordinating Committees (SOICC) and Career Information Delivery Systems (CIDS) give presentations on their states' efforts with specific alternatives. In addition, several hardware vendors discussed their products and how they may affect the future delivery of career information. The presentations were grouped according to the category of alternatives being discussed. The order of presentations at the conference was as follows: (a) automated alternatives, (b) nonautomated alternatives, (c) microcomputers, (d) related programs, and (e) how more than one alternative can be used in a state. An exhibit period also was incorporated into the conference. During this time, presenters had the opportunity to exhibit and demonstrate the alternatives.

The majority of conference attendees were the SOICC and CIDS staff members. In addition, numerous other individuals attended. These people were mainly local and state level information providers interested in learning about the different alternatives, particularly the microcomputers.

This document contains the papers that were developed for the conference. They are presented here in the order in which they were given at the conference.

The papers and the conference indicate that career information can be distributed in more than one form. It can be formatted in ingenious, simple, and sophisticated ways to meet the needs of the different clients.



SECTION I

SOME AUTOMATED ALTERNATIVES

BATCH PROCESSING

Lee T. Maddox, Assistant Director
Alabama State Occupational Information Coordinating Committee

Means of Delivery

The use of batch processing began in Alabama when it was determined that more than one delivery method was needed to provide career and occupational information. Batch processing was an appropriate option for institutions where line costs would prohibit the use of computer terminals.

This led to the development of the career and occupational information questionnaire that could be sent and returned in batch from the rural educational systems. This questionnaire contains career training, occupations, and financial aid characteristics that individuals could fill in and return to the SOICC office. The staff would code and enter these characteristics into the system and return information by way of a computer printout to the individual.

By far the greatest volume of data processing to date is still handled by batch computer systems —so called because the documents or transactions to be processed are grouped and entered into the computer in "BATCHES," thus achieving a relatively high degree of control at a relatively low cost.

A Good Alternative for Alabama

Alabama is a very rural state in terms of using only computer terminals to provide career information. Having two major and several minor telephone companies, telecommunication costs would prohibit using terminals in every junior and senior high school in the state. The cost factors estimated for the Alabama legislature in 1979 found it would cost approximately two million dollars to set up and over a million dollars each additional year to provide computer service to every junior/senior high school in Alabama. This would represent each school system receiving one terminal and one port per fifteen hundred students in grades nine through twelve in the 127 school systems. At that time, the system had contracted forty-six ports serving eighty-two sites.

By using "Batch" career processing since January 1980, SOICC was able to process and return over five thousand career and occupational requests and provide up-to-date JOB BANK openings information to over 31,000 people using the toll-free Wide Area Telephone Service (WATS) line. This system enables us to serve city and rural school systems, CETA summer youth program participants, and unemployed individuals who would not have received this service prior to the development and implementation of this program.

Refining the System

We are in the process of developing the system so it will allow us to take a batch of requests and code the name, address, and characteristics of information requested into the computer, storing this information to be run later. This process involves a sequential search of disk storage. One request questionnaire document accession number after the other is entered into the computer working core, internally checked by comparisons according to the descriptors selected, and the result of the comparisons stored for later output or permits immediate feedback of interim search results and the direct printing of search requests. The address labels are entered in the same sequence for the printout.

We are also looking at the cost of installing four or more WATS lines hooked directly into the computer on rotary. This will enable some of the rural school systems to use computer terminals on a rotating basis.

MAINFRAMES

Nancy Mayle, Acting Director
Ohio Career Information System

Means of Delivery

The means of delivery for the Ohio Career Information System (OCIS) is a network of nineteen time-sharing computers serving the major metropolitan areas of the state of Ohio. OCIS Information Tapes are installed on the various computers that are accessed by computer terminals with dial-up capabilities located at the user agency site. The computers support printing terminals, video display terminals, or a combination of both. The majority of the users prefer the printing terminals that provide students/clients with a hard copy of the information that can be saved for future reference.

Implementation

In order to implement a career information system on a mainframe, several factors must be considered. It must be established whether or not the computer program is adaptable or convertible to the type or types of mainframes being considered. Secondly, the number of potential system users and their geographic distribution within the chosen service area must be determined. With these two factors determined, the decision as to what kind of computer, size, capacity, number of terminals, and cost can be made.

In choosing a mainframe delivery system, the computer must be large enough to handle the volume of usage and amount of information to be stored. Consideration must also be given to the number of computers needed to serve the intended target groups, method of acquisition (i.e., purchase, lease, or contract services), and cost of acquisition. The factors affecting this decision include not only the funds available for initial installation of equipment, but also the cost effectiveness of information delivery to users, and expected revenue, if any, to be generated. The Career Information Delivery System (CIDS) can either purchase and operate its own computer or contract with commercial/educational computer centers to provide services to users. At its inception, OCIS joined an already existing computer network.

Advantages

The advantages of mainframe computers for a system like OCIS are many. For a system with a large information base, the mainframe offers a large storage capacity and enough power to operate quickly and efficiently. Mainframes are accessed by telephone, thereby eliminating the need for the individual user agency to own its own computer, which keeps costs of providing career information to a manageable level. Finally, a wider variety of software packages is available for the mainframes, making them applicable to more users.

Disadvantages

The disadvantages of the mainframe seem to be relatively few. The main disadvantage is the lack of control the CIDS has, unless it owns and operates its own computer, over the program priorities, hours of operation, and number of ports available for users. Also, in a contract situation with a commercial computer center, the CIDS has limited control over rates charged for computer time usage. Finally, since a large number of users are tied into each mainframe, more users are affected by equipment malfunctions than would be the case with the mini or microcomputer.

Cost

Costs involved in using a mainframe for information delivery include, of course, the initial expenditures of purchasing or leasing the computer, the cost of installing and maintaining the telecommunications equipment, charges for computer maintenance, and the salary of operating personnel. Other costs may include space rental, utilities, and environmental control. In those instances where the CIDS contracts with commercial computer centers for information delivery, costs include tape conversion for different computers, fees charged for computer time and, in some cases, fees assessed for information storage.

A Good Alternative for Ohio

The mainframe is a good alternative for OCIS because of the widely diverse user groups and the geographic distribution of users. For a statewide system in a large state, the program can be made available to a larger number of users by having several mainframes strategically located throughout the state.

OCIS users are able to access the nearest computer by telephone and are able to use it on a time-sharing basis, thereby reducing their costs. Mainframes also make the program available to those agencies who do not own any computer equipment. Other advantages for both the CIDS and user agencies are that they pay only for actual computer time used and are not responsible for computer maintenance or system programming.

Policy Decisions

The determining factor influencing the decision of OCIS to use mainframes was a state of Ohio regulation governing the purchase of computer hardware. Since OCIS is under the administration and direction of a state agency, the Ohio Bureau of Employment Services, there was little choice as to the method of system delivery. These regulations prohibit the purchase of computer hardware except by certain specified state agencies. Consequently, OCIS was not permitted to purchase micro or minicomputers.

The size of the state and the cost of telecommunications prohibit OCIS from using only one mainframe to serve users. Therefore, it was decided to join an already established network of commercial/educational computer centers offering time-sharing services. These centers run the OCIS information tape and charge users only for computer time used. With this arrangement, it was not necessary for OCIS to employ a computer programmer or technician, which freed more funds for information development and user services staff.

Unique Feature

The unique features of a mainframe include dial-up capabilities, i.e., remote accessing of computer by telephone. Also, mainframes have sufficient capacity to store large amounts of information and programs, and the operating systems have built-in features permitting the CIDS staff to write, change, or adapt the software programs. Many users can access the system at the same time and can run different programs without affecting other operations.

User Reaction

User reaction to the mainframe has been very favorable, due in large part to the quality of service provided and the generally affordable costs involved in the use of a time-sharing system. At this time, the OCIS software is available only for mainframe computers. No conversion has been made for the micro or minicomputer operating system. As more agencies acquire mini or microcomputers, the demand for software will likely increase. This will, of course, necessitate a study of the feasibility of adapting the system to operate on the smaller computers.

TELEPHONE LINKING

Rick Henderson, Specialist
Ohio Bell Telephone Company

The telephone company wants to be included in the planning stages of developing computerized delivery systems. If the telephone company is not consulted at that time, problems may be encountered in networks, especially those servicing rural areas or very long distances.

Many time-share networks are presently operating in telephone systems not designed to handle data. In addition to problems involving remote areas or long distances that may involve several telephone companies, there is the increasing problem of data becoming too sophisticated for dial-up communication within existing systems. Dial-up access is adequate at speeds of 300 to 1200. Higher speed data works better on a private line. At that point a full duplex, private line may be recommended. This type of line is designed to meet the needs of the clients' specific data parameters.

Telephone companies want to provide the best data processing service at the lowest possible cost. They can best do this only if users work with them in designing the network so that the phone company can design and provide the most appropriate facilities. As facilities are improved and expanded, people will be capable of accessing more and more services with one machine.

NEW DISTRIBUTED PROCESSING APPROACHES TO CAREER INFORMATION DELIVERY

Louis V. DiBello
Computer-based Education Research Laboratory,
University of Illinois at Urbana

Presented by Jan Staggs
Illinois SOICC

Overview

A problem on the cutting edge of current telecommunications and computer technology is to combine the advantages of an interactive network computer system with the cost reductions of a stand-alone microcomputer. Through the Computer-based Education Research Laboratory (CERL) at the University of Illinois, initial implementation of a career information system is being planned on the current PLATO computer system. Research and development is also being carried out on the development of new microprocessor-based, distributed processing systems. The application of these new concepts to career information systems will be carried out under the auspices of the Illinois Occupational Information Coordinating Committee.

The PLATO System

The PLATO System has several characteristics common to many networks and also some characteristics that are unique. Among those characteristics common to many networks are the following:

1) *Central data base.* The data base of occupational information and education and training is stored on a single central computer. Updating this data base need only be done to this one copy, and the updated version is automatically available to all users.

2) *Central development.* System enhancements are centrally developed and immediately disseminated across the state.

3) *Low maintenance costs.* Data base and central computer maintenance costs are shared by all users.

4) *Institutions need only purchase a terminal and telephone line, not a computer.* Bringing a terminal into an institution or remote area of the state provides the very best and most up-to-date career information that exists. Thus, institutions with low staff resources for career counseling can benefit from high quality career information.

5) *Ongoing communication and line costs.* Each terminal has communications line costs as well as central processing costs, and these costs are ongoing.

Among the characteristics that distinguish the PLATO system are the following:

1) *Highly interactive.* Each key press echoes back to the central processor, and the echo time is less than one quarter second. This allows for each key press to be under program control.

2) *High resolution, graphics, touch-sensitive screen.* The PLATO screen is 512 x 512 dots, with full graphics capability. This screen thus allows for diagrams, animations, special characters, sized text, and highlighting. In addition, the screen is sensitive to the touch of a finger.

3) *Powerful, higher level language.* The TUTOR language, which was specifically designed for development of instructional packages, combines convenient display routines for text and graphics displays; sophisticated input handling routines that allow combinations of numeric, alphabetic, and touch inputs to be processed by the program; data base and file management routines; calculation and logic routines; and sophisticated branching capabilities.

4) *Existing library.* Comprehensive library of basic education, college, and university courses, world of work, CETA orientation; other materials including statistics routines and data-handling routines; and administrative systems such as computer conferencing, electronic mail, and real-time interterminal communication.

5) *Extensive network of terminals already in place.* Over five hundred terminals are already in place in locations across the state that would be primary targets for a career information system. There are already terminals in Illinois prisons, adult education classrooms, juvenile facilities, high schools, community colleges, and CETA prime sponsors.

Stand-alone Computers

Stand-alone computers generally means computers such as APPLE, TRS 80, and the like. These computers often have low resolution screens, sometimes nongraphic screens, low-memory capabilities, and restricted language capabilities—generally BASIC. The most significant characteristic of these computers is that they are isolated. They do not communicate with one another except by physically transferring a disc from one stand-alone computer to another. The University of Illinois has begun development of instructional materials on several new, high capability stand-alone terminals that have the same full graphics capability, the same screen resolution, the same answer-handling capabilities, and generally the same language capabilities as TUTOR. Programs have already been developed and successfully pilot tested in university chemistry courses and in Job Corps basic education programs. Stand-alone computers with floppy discs do not appear to have enough memory to provide adequate career information services. Utilization of a hard disc can overcome this problem. However, it is critical that the hard disc be able to be updated quickly.

Distributed Processing Cluster Network

Current work at CERL is directed toward development of a distributed processing cluster network. The elements would be –

1) a large and powerful central computer;
2) a large network of remote terminals organized into local "clusters";

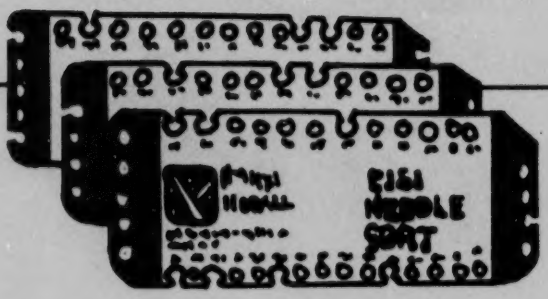
3) each terminal will contain a microprocessor with enough local memory, processing power, and software to permit local processing of the majority of user programs;

4) each terminal in the cluster will be connected to a local hard disc unit and a communications interface controller;

5) the local hard disc and communications controller for each cluster will be connected on demand to the central computer by telephone lines.

This sytem should require much lower central processing and communications line charges per terminal than current central computer networks since most processing of user programs would be done locally. The line to the central computer would be used periodically for updating programs on the local hard discs, and for transferring data from the local discs up to the central computer. The central computer would still contain the master copy of any program or data base.

In this way it is hoped that the advantages of centralized development and dissemination, centralized data base, and high capability terminals can be retained, while significantly reducing line and processing costs. Illinois hopes to test out this concept by applying it to the delivery of occupational and career information.



SECTION II

NONAUTOMATED ALTERNATIVES

NEEDLESORT

Elton Mendenhall, Director
Presented by Karen Joyce
Nebraska Career Information System

Developing a Career Information System

The development of any major project involving several people or requiring cooperation from a variety of governmental agencies hinges upon a position of philosophy. Many projects focus upon goals and objectives without realizing the importance of a philosophy. A project director needs to be aware of the similarities of purpose, charter, or authorization between agencies rather than their differences. Likewise, a project coordinator must be aware of the similarities of purpose and personality of people that must provide support to that project. The maze of goals and objectives found in many agency documents or personnel management systems reflects highly specialized purposes. This may cause concentration upon these specialized differences rather than the common philosophy of purpose or service that may be the bond between agencies or people.

The Nebraska Career Information System (NCIS) has evolved because of the common need recognized by a variety of service structures. The evolution of NCIS from this common need has provided a philosophical support to the reasoning for such a major effort and information structure. Early planning recognized the need for a common set of information for use in career counseling. It was also recognized that the delivery of such information would have to fit rural and urban populations as well as areas where computers were available and areas without any kind of computer support. These were primary concerns that influenced selection of a career information system with options for both manual and computer delivery capability. The Oregon model was selected because of the needlesort process for manual delivery and its computer system, both of which operate with an identical data base and access procedure. The final factors in favor of the Oregon model were the characteristics of a more "complete" counseling system concept than some so-called "systems" and an active technical team available to assist in developing and implementing the system.

Delivery of Information

Delivery of information is an objective of career information systems as well as most other information systems. However, there is a tendency among many new projects to concentrate upon the logistics of information delivery before there is anything to deliver. There are a variety of delivery strategies for career information that are valid for the particular application or circumstance. That does not mean that each delivery mechanism is applicable to each information system. Certainly one cannot rely upon computer networks to deliver career information if computers do not exist in all areas of the delivery area. Neither can a needlesort system print out an individual response to information requests. Therefore, Nebraska became heavily involved in information development as a first condition to information delivery. This position acknowledged that several delivery strategies would eventually be addressed, and that the information structure should be designed for student/client use rather than to the dictates of a specific delivery strategy. A unique quality of the Oregon model was that once the information was developed, it was ready for either the manual (needlesort) delivery mode or the computerized delivery mode. It also included the components of access strategy and assessment, occupational information, and education and training information. Each component is interlinked through coding and referencing in the texts and files of various components.

Delivery of the manual (needlesort) system is a logistics problem of packaging and shipping once the information is developed and printed in proper form. Training in the use of NCIS is a part of the delivery strategy and is required of each user site under contract. Training strategy and development is equal to information development in importance. This training activity is part of our delivery strategy and includes background information, demonstration, directed activity, and hands-on activities for use of all materials and components. The training philosophy and design for manual delivery is identical to the training required of computer site users. The manual system uses hard-copy materials while the computer system uses the file structure of the program to reference the same information. The components of the Nebraska manual (needlesort) system are: (1) a *User Handbook*, (2) the needlesort deck, (3) the *Job Sheet Notebook*, (4) the *Postsecondary School Information* book, (5) the *Postsecondary Programs of Study and Training Information* book, and (6) a *Reference Manual* for counselors. These components are leased to service agencies and institutions as a complete set.

Preparation for Implementation

As indicated earlier, the logistics of packaging were the normal kind of considerations to provide both visibility, storage, and usability for the career information. The needlesort cards are packaged in a plywood box that allows storage of the cards and needle. These boxes were manufactured by the local Goodwill Industries according to NCIS specifications. The job sheets, school and program information books, and reference manuals are provided in three-ring binders for identification and ease of updating. Materials are distributed and updated in conjunction with training workshops held throughout the state each year.

Preparation of information is difficult and time-consuming and plans should allow for printing, training, and delivery prior to the intended use cycle of various populations. A *Dictionary of Occupational Titles* (DOT) based system, such as Nebraska's, requires all occupational information coding to relate to attributes of job traits using U.S. Department of Labor analysis and taxonomies. Occupational information is linked to training and school or program information throughout the system. This process involves extensive cross-referencing to provide easy access and use of system components by users and/or counselors.

Advantages of Needlesort

Nebraska does not market the needlesort as an independent structured sorting process for an occupational list. The intent is to provide a process for career information, linking assessment, and testing to an access strategy ("QUEST") to career information files. These files identify occupational information, training, and educational opportunities in Nebraska schools and programs. Development of the referral procedures for job selection and application are in the design stage.

The following list of advantages is representative of NCIS staff observation and comments from counselors and clients. These advantages are:

1. The user can see what is happening in the sort process as occupations drop off or are retained due to a specific response to any of the twenty-one "QUEST" questions.
2. The user has a chance to read each job title and definition.
3. The needlesort is portable to remote areas or for use in a one-on-one basis with parents, students, and clients.

4. The manual process of sorting provides stimulus to changing and exploration of different responses because it is immediately apparent that additional titles may be lost or retained.
5. The purpose of the needlesort is career guidance, thus it is not subject to "shared time" problems related to terminal use.
6. Needlesort cost is much less than terminal cost.
7. The manual system linked to reference documents, i.e., job sheets, school and program information, and the like, provides information much quicker than the computer output process.
8. More clients/students can access a variety of information in less time on the manual system than the computer system.
9. Materials in manual system can be used more easily in a group setting than the computer terminal.
10. Hardcopy materials can be made more visible as a system than computer terminal used for multiple activities.
11. Hardcopy materials can be used within classroom-structured activities designed for career units and as motivational resources relating to the world of work.

Disadvantages of Needlesort

The disadvantages of the needlesort "manual" system are as follows:

1. Some people are more highly motivated by technological innovations such as computer terminals.
2. The hardcopy materials associated with a needlesort (manual) system are costly to update and reprint.
3. The hardcopy materials cannot be updated as easily or rapidly as computer files.
4. Logistics of delivery are not as easily managed as computer delivery once the computer network is in place.
5. The manual sorting of the "QUEST" questions is more time-consuming than the computerized sorting process.
6. The manual system cannot print out a list of occupations as each card remaining on the needle constitutes the list in the manual sort process.
7. Materials to be given to students must be xeroxed.
8. In some cases security of hardcopy materials may be a problem.

Many of the advantages and disadvantages of the manual needlesort system can be applied to the computer system with slight variation. For example, security of information is a problem for computerized systems as well as for hardcopy systems.

One concept that should be recognized is that an accessing strategy and an occupational list does *not* constitute a career information system. Without a structure for comprehensive client assessment, access procedure, school and program information, training opportunity information, occupational information, employment information, placement, referral, and follow-up procedures, there really is not a complete system.

Needlesort Cost

Nebraska has calculated its total developmental cost for the entire career information system at approximately $200,000 over a three-year period. This cost included the information development, printing costs, and inservice training of counselors throughout the state. Initial printing of 500 needlesort card decks was contracted with McBee Company at $39 per deck. Current replacement costs have been estimated at $65 per deck. Since the developmental cost included all information development, printing, training, and loading upon computer, there is no way to separate costs for the needlesort versus the computerized version. They are both operational in Nebraska.

Dividing the 500 manual sets into the $200,000 developmental cost provides one way of estimating unit prices at $400 per manual set. Computer costs for developing the system and delivering to the schools now using the computer version were absorbed by the Educational Service Unit serving that area. In return for the computer use, NCIS has released the information system to the Educational Service Unit, free of charge.

Nebraska chose to develop its information before implementing a computer delivery network. Therefore, the manual system became the first delivery strategy and network. The computerization of the information was inherent in the Oregon model and was ready for use as soon as computer networks were identified that could support the system.

Needlesort As an Alternative

NCIS is built around the position that computer systems are an alternative to hardcopy materials. Needlesort is an alternative for a number of access strategies such as a series of questions about occupations, matrix matching of choices, or random reading of the *Occupational Outlook Handbook*. The point is, you cannot consider needlesort as an alternative to computerization. It can be an alternative to that single file or access strategy that asks questions and lists occupations fitting a particular response profile.

If I were a counselor I would want both a manual system and a computerized system, preferably using the same data base. The advantages and disadvantages presented earlier address the rationale for both delivery methods. Some people do not like computers and some people prefer to use a computer terminal. Counselors need to be in a position to identify with both preferences and deliver information in the mode most motivating to the client.

User Reaction

The Nebraska Career Information System has conducted several evaluations to identify perceptions of counselors toward the system. The overall reaction to the NCIS was very positive.

A recent survey, conducted by the North Dakota SOICC, of needlesort users in Iowa, Nebraska, South Dakota, and Wyoming indicates that Nebraska users rated the needlesort very high. The survey asked about: (1) ease of use, (2) attractiveness to clients, (3) valuable use of time, (4) ease of administration, and (5) acceptance by clients. The North Dakota study provides a most realistic summary to the issue of needlesort in the following statement.

> It would appear that like many other guidance, counseling, or career education tools, the needlesort structured search is a valuable learning device. Its success depends on the enthusiasm and knowledge of use of the person administering it

to a client. The needlesort works equally well in large and small schools; however, the postsecondary setting may have a challenge in motivating themselves and the clients in using it. The needlesort structured search has some definite advantages over other methods just as it has some disadvantages.

It would appear that, in those states which keep the career information system up to date, which keep the needlesort decks updated and in good repair, and which give adequate inservice, that the needlesort-structured search is an efficient, effective, and popular tool.

Summary

The evolution of career information systems is fast moving into an age of new innovations that include microcomputers and videodisks. As usual, technology is ahead of general usability. This is especially true in public agencies and institutions. An issue that career information systems need to address lies within that gray area of what is nice and what is practical. Technology has provided us with the ability to quickly retrieve vast amounts of information. However, there is little evidence that the human mind has evolved to a level that can comprehend the amount of information available. Career Information Systems began with a belief that they saved time in the process of career counseling. It is again time to review the information and provide that information most essential to the counselor or client who does not have time to read and absorb everything that is available.

THE SCAN PROCESS

David Caulum, Coordinator
Wisconsin Career Information System

Overview

Four years ago, the Wisconsin Career Information System (WCIS) was presented with the task of developing a "stand-alone" printed version of its computer-based system. The complete printed system that has evolved is an excellent example of a cost-effective delivery approach.

SCAN Process vs. Needlesort

At the time the WCIS printed delivery system was developed, two approaches to "sorting" occupational titles were in use in DOL grant states. (Parenthetically, it might be noted that these are still the only two viable approaches.) The needlesort developed by the Oregon CIS was either in use or being developed for use by most states. Michigan had developed an alternative sorting mechanism titled SCAN. An analysis of these two approaches completed by WCIS staff four years ago (WCIS Final Report 1975-79, Caulum) is included in this report. The relative merits indicated in this figure still are apropos today.

The overall analysis does not show a distinct advantage for either process. However, it does clearly point out the relative advantages and disadvantages of each based on the different factors analyzed. Based on this analysis, WCIS chose the SCAN process. Two factors figured most significantly in this choice.

1. *Cost.* With the decrease in federal dollars and the need to become self-supporting, the expense for a user site as well as the system's capital investment seemed critical.
2. *Utilization.* Two potential uses existed for a sorting process: (1) a stand-alone system for sites having the printed version in which group application would be frequent; (2) a backup and/or supplemental approach for sites having the computer version in which group application would predominate.

On balance, the SCAN process promised to be slightly more effective for group application; further, it was obviously less expensive. Over three years of use, WCIS staff have not had cause to regret their choice.

SCAN

SCAN is a relatively straightforward paper-and-pencil sorting device. Very simply, users construct profiles of themselves that they subsequently match with occupational profiles contained on SCAN sheets. The users' profile is recorded on a SCAN worksheet; the *SCAN Booklet*, containing

WCIS ANALYSIS OF OCCUPATION SEARCH METHODOLOGIES

Attribute	SCAN Process		Needlesort Process	
	Rating	*Comments*	*Rating*	*Comments*
Use with or by individuals	0-	Very cumbersome and somewhat artificial to use directly with individuals by a counselor; however, can be used prior to counseling, then discussed	+	Very effective to use with individuals by a counselor; can also be used beforehand and discussed
Use with or by groups	0+	Easy to use with large groups, also effective with small groups, although group discussion and interaction limited	0+	Can be used by small groups; facilitates discussion in small groups (enough decks rarely available for large groups)
Flexibility of methods	0	Deviation from the "normal" process of use is difficult; although several processes available	+	Deviation from "normal" process is simple
Variables allowed	0	Limited by size of SCAN sheet	0	Limited by size of card
Capacity to facilitate exploration	0+	Different combinations possible but time is consumed	+	Encourages "playing" with different combination of variables
Cost	+	Extremely inexpensive; thus, cost can facilitate large group applications	-	Extremely expensive; thus, cost of decks can negate some of the positive group applications

directions, is reusable. The SCAN process is flexible. As evidence, many user sites have developed their own unique processes for using SCAN.

Earlier, two factors—cost and utilization—were mentioned as influencing the selection of the SCAN process by WCIS staff. After three years, data are available to evaluate the actual experience in both areas.

COST, DISTRIBUTION, AND REVENUE 1980-81

		SCAN Booklets	*Worksheets*
A) Distribution (through Jan. 1981) – 600 sites			
– Original Distribution (N/C to users)		6,000	6,000
– Sales		12,500	67,000
	Subtotal (in use)	18,500	73,000
– Inventory		6,700	6,000
– Other (staff use, training, etc.)		800	1,000
	Subtotal (not in use)	7,500	7,000
	TOTAL PRINTED	26,000	80,000
B) Cost			
– Printing Cost		$2,050	$450
– Typesetting Cost		600	50
	TOTAL COST	$2,650	$500
C) Revenue (through Jan. 1981)			
– Number of Copies Per Set		25	100
– Cost Per Set Sold—Discounted Price		$3.10	$1.75
– Number of Sets Sold		500	670
	TOTAL REVENUE	$1,550	$1,172
D) Summary			
– Total Cost for SCAN Materials		$3,150	
– Total Revenue (i.e., cost to users)		2,722	
	NET (through Jan. 1981)	-$ 428	

It should be noted that WCIS pricing schedules are designed to make materials cost as low as possible in order to facilitate use of the system. In other words, materials are not intended to be "profit" items.

Utilization

Of course, one very good way to look at utilization is to examine the number of copies in use. Currently, 73,000 worksheets have been distributed to user sites. Potentially, 73,000 individuals will use SCAN during 1980-81 assuming no additional sales.

However, a more realistic picture emerges by examining some statistics collected in past years on percentage use as well as the total number of expected actual users during 1980–81 of any WCIS product or service.

	Type of Site	
	Computer	*Printed*
Estimate of Actual Users (any WCIS material/product)	111,000	74,000
Percentage Expected to use SCAN	9%	68%
Total Number Expected to use SCAN	9,900	50,300
TOTAL USE	60,200	

In terms of user response to SCAN, the data (see *WCIS in the High School Setting: Six Case Studies,* Augustin and Knapp 1980) paint a positive picture. Comments by users indicated the SCAN process was both interesting and informative.

In summary, the results of three years of experience by WCIS with using SCAN presents a most favorable result. The cost and utilization data suggest the following conclusions:

1. In considering cost alone, the WCIS investment in the SCAN process is small. In addition, revenues generated will be close to equaling cost by the end of 1980–81.
2. For user sites, SCAN is inexpensive. Assuming 60,200 individuals will use SCAN during 1980–81 and the revenue will equal cost ($3,150), the cost per use is most reasonable ($.05 per use).
3. In comparison with needlesort delivery, SCAN also emerges favorably when considering cost. The cost to systems using needlesort is approximately $40 per deck, although this varies with the number of decks printed. WCIS would need at least 300 decks (300 printed version sites) that would involve an investment of $12,000. However, to enable group use, at least 300 additional decks would be required at a total cost in excess of $20,000. Assuming the same number of users, the cost per use would be close to $.33 or over six times the cost of SCAN.
4. Data on satisfaction of users with SCAN are favorable. At this time, data do not exist comparing user reactions to the two approaches.

MICROFICHE

William H. Sharp, Manager
Arizona Career Information System

Overview

The Arizona Career Information System (ACIS) is a statewide project funded under the National Occupational Information Coordinating Committee (NOICC) Career Information Delivery Systems (CIDS) Grant Projects. We have a computerized occupational and educational information system that is delivered to ninety terminal sites around the state and a microfiche alternative delivery format.

Means of Delivery

Arizona has contracted with the Time Share Corporation (TSC) for the GIS III system. Under this contract TSC provides tapes for our computers containing six national and three local files. In addition, Arizona has two other computerized files that are accessible to anyone using the GIS III program. All but one of these files is also available on microfiche, nine from TSC and one produced locally by the Arizona Commission on Postsecondary Education.

ACIS microfiche is delivered as a three-ring binder with sets of instructions and panels of microfiche for each of the ten files.

ACIS microfiche is generated as Computer Output Microfiche (COM) directly from the computer tapes. It contains the full format of those files and, depending on the complexity of the file, an index or cross-reference matrix of up to 285 items, which allows ready and selective access to the data base. The files included are: 875 national occupations; 250 Arizona occupations; some 5,100 two-year, four-year, and graduate college and university schools; 427 financial aids; 105 military occupations; 60 Arizona apprenticeships; 341 Arizona employers; and 220 Arizona Vocational-Technical (postsecondary, noncollegiate) schools.

Preparation Required

Preparation for using ACIS microfiche is minimal. A forty-two power microfiche reader or reader-printer is required. The ACIS staff will provide training on use of the fiche and assist in integrating this data base into existing counseling programs.

Advantages

The principle advantage of microfiche is to be found in its purpose in Arizona. Arizona is geographically one of the largest states in the United States. It has only two urban centers and three

other moderate-sized cities. Seventy-five percent of the state's population is found in the two urban counties.

At the present level of technology, the support of a computer of adequate power to carry a career information system requires more resources than are available to many schools, social service agencies, and even some of the more remote counties. Even where computers are available, the vast distances require the use of long distance telephone lines at great cost. In schools that are small, the cost of purchasing and operating a computer terminal is large when compared to the size of the school's population and potential utilization. (These terminals frequently may be used for only the one counseling program.) Cost of the computerized system is therefore difficult to justify. Our purpose is simply to provide the data base where it is not accessible via current electronic data processing technology.

There is a second major advantage to microfiche that involves the high level of organization of career and educational information provided by this format. For example, each career description in the two occupational files consists of a compilation of information from a variety of sources. A description provides a narrative that includes information about the occupation and its duties, related school subjects, methods of entering the occupation, career advancement options, employment outlook, related occupations, and other sources of information, address to write to for additional information, and a detailed itemization of characteristics relating to that occupation such as aptitudes, interests, working conditions, employment outlook (from national to county levels for the Arizona occupations), and a host of other characteristics related to values, educational and vocational preparation, and occupational clusters. There are up to 350 characteristics.

The college and university files contain the equivalent of over 5,100 current catalogues accessible by major and geographic locale. The information in these three files consists mostly of itemized detail and runs to over 700 characteristics. Similar information is provided by Arizona on its 220 noncollegiate, postsecondary institutions, both public and private.

The 427 financial aids information pieces are current and represent a rapidly expanding data base providing essential information for obtaining financial assistance from major sources including federal, state, and private assistance programs. Many of these are generally unknown even to professional financial aids officers.

The Arizona Employer File represents a resource that is not otherwise available. It provides access to data about major employers through a list of 450 occupational titles and approximately 200 additional characteristics. On the microfiche format, all of these characteristics are detailed for study and accessible via a matrix of occupational groups, counties, and areas of business.

The final advantage that will be specified here is that of the organization of the data. Having been originally entered into a computerized format, the information base can be organized and cross-indexed to a high degree. In generating microfiche from computers, a program can be written to provide indexes via the characteristics listed in the file. For the more complex files, that index is currently presented in a matrix of close to 300 items.

Disadvantages

The major disadvantages of microfiche are three in number. In the first instance, like all noncomputerized information retrieval, microfiche lacks flexibility in accessing the data base by highly selective, individualized characteristics. This is a disadvantage it shares with hardcopy manuals. It

does not readily allow students/clients' core characteristics, their interests, aptitudes, and values, to be accessed and captured as well as the computerized system.

Second, and very importantly, providing a hardcopy of the microfiche content can be expensive. It is generally preferred to provide the student with a hardcopy of information for study. A microfiche reader-printer can easily cost as much as a computer terminal and this becomes a disadvantage in locations that choose microfiche as an alternative to the cost of the terminal. Microfiche readers may be purchased for approximately $150 and up. A quality microfiche reader-printer is relatively expensive and may cost $1,200 or more when new.

Cost

At this stage of utilization at least, the cost for annual updating of microfiche is essentially the cost of the original microfiche package itself. Like other hardcopy material, the entire format must be replaced, including indexes that become obsolete as the data are developed and expanded. The cost of the Arizona microfiche is currently $250 per set.

Why a Good Alternative

The value of microfiche is to be found in its advantages listed previously. It provides a compact, highly organized, and extensive data base (some of which is not otherwise available except through the computerized delivery mode) at a relatively low cost. It is ideal in locations that do not have access to computers of sufficient power to handle a large data base or where long distance telephone costs are an important consideration. It is also, however, valuable as a reference tool for locations that do have computer terminals. There are numerous research applications for the ACIS microfiche. Due to the organization of the material, it is faster and more efficient than current printed material and it is more compact.

Policy Decisions

The decision-making process in selecting microfiche is as detailed in the previous section. The advantages and disadvantages must be weighed against cost and resources available to the prospective user.

The unique feature of microfiche is the immense amount of data contained in a very small package. For instance, the 42X format we use provides room for 416 columns of fifty-six lines of sixty characters, or up to some 280,000 words per fiche, the equivalent of a fat book.

Unique Features

While not computerized, microfiche is generated from computer tapes. Being an organized data base, it includes compilations on occupations from a variety of different sources and classifications of occupational information. This information is listed out for each occupation. Local information files may represent unique collections of information. Based on a computer-generated (COM) data base, comprehensive indexes can be generated for each file, which is otherwise difficult to organize for printed manuals.

Arizona has just begun using its microfiche and so has not extensively evaluated this format, but the advantages described are evident.

TELEPHONE HOT LINES

Juanita K. Snipes and Carl McDaniels
Virginia Polytechnic Institute and State University

Presented by
Juanita K. Snipes

Means of Delivery

The Career Information Toll-Free Hot Line is a means of delivering career (occupational and educational) information to Virginians by an 800 telephone number. Through one incoming line to the Virginia Occupational Information Coordinating Committee (VOICC) project, Virginians can obtain directly, and most often immediately, answers to their inquiries on job outlook, occupational licensing, educational financial aid, occupational requirements, and postsecondary educational opportunities. The telephone is manned during regular business hours, from 8-12 and 1-5 o'clock, by professionals in the field of counseling and career information and graduate research assistants in counselor education. An answering machine takes messages during the lunch hour and on holidays. Initially, the answering service was used overnight also; however, it was discontinued because callers were not leaving complete messages so that return calls could be made by staff members.

Information requested is given to the caller on the hot line immediately in most cases. For some inquiries, the caller is asked to call back giving the hot line personnel time to research the question. The only mail-outs attempted at the present time are brochures prepared by the Virginia Council of Higher Education on financial aid.

Preparation Required to Implement the Hot Line

Implementation of the hot line required preparation in obtaining the hot line or 800 service and development of strategies, materials, training, evaluation criteria, monitoring procedure, and media for advertising the hot line. Lead time of about six weeks was needed to obtain the 800 number. We were unable to obtain a readily identifiable number such as 1-800-1000 or to use a work identification number such as V-Career. Such a number would have been easier to remember and to publicize. Our first priority in initiating the hot line was to establish the purpose, limitations, and descriptions of the services to be provided by the hot line. The hot line was advertised as providing information based on the following categories: postsecondary educational opportunities, educational financial aid, job opportunities, occupational requirements and outlook, and career referrals. We refer people for counseling services and other services that can be obtained by the caller to I&Rs, Educational Opportunity Centers, Educational Information Centers, and other similar agencies.

For the initiation of the hot line we assumed that information requested would fall most frequently in one of the following categories: accreditation, admission requirements for postsecondary education and training, college characteristics, educational financial aid, job outlook occupational requirements, courses/program offerings, referrals, and wage and salary data.

We then assumed that the largest numbers of callers would be interested in information concerning their more immediate vicinity. Consequently, we developed a strategy for accessing information in the system geographically. Using a large wall-sized state map that identifies counties as well as cities and towns, we color-keyed the two- and four-year colleges and the area trade and vocational centers. Also, the map aids in identifying the closest agencies, offices, and services for the caller.

Next we identified the state and national sources of information that would answer questions in the categories selected. We assembled the publications including special Virginia publications, VED data and U.S. Department of Labor publications, VED Job Bank microfiche, national publications, unpublished data directly from agencies, and lists for referrals as well as other hot line numbers for referral. The room containing the hot line was then converted into an operational room with posters and bulletin boards lining the walls, shelves that contain the primary materials and secondary materials, a telephone with an extra-long cord, and a microfiche reader. Operational procedures such as how to answer the phone, how to identify and explain services, and how to record information were established and training sessions held to ensure the uniformity in answering inquiries. A log was developed for record keeping and evaluation. A media committee, representatives from the VOICC and EIC committees, serve as an advisory committee on the dissemination of information of the hot line, including strategies to reach target groups, types of media, schedule for advertising, budgets, and other information. To date, a poster, calendar cards, telephone stickers, and a brochure have been developed to increase community awareness of the hot line. A dissemination plan has been developed for media materials, radio and newspaper releases, and presentations. About 90,000 calendar cards and 2,500 posters have been distributed and two separate radio and newspaper releases made to daily and weekly newspapers. Additionally, two radio interviews and an interview with a newspaper columnist have been given. Letters have been written to the vocational-technical directors in the school districts and the adult basic education supervisors. The 1981 calendar cards and an announcement on the hot line were included in the *Forum,* which is the VOICC newsletter that has a distribution of 3,500, including the Virginia Personnel and Guidance Association members and the Educational Information Centers in Virginia. Presentations were made at the Virginia Personnel and Guidance Association's fall conference and materials were disseminated at an exhibition booth.

Advantages

The advantages of the toll-free hot line as a vehicle for statewide delivery of career information are many.

1. The statewide system was inaugurated with comparatively little staff, costs, and preparation lead time.
2. The system is accessible to the widest number of users, those with access to the telephone.
3. The hot line is reaching a target group of users who are not associated with agencies or educational institutions, a target population usually underserved.
4. The hot line complements existing agencies by providing a referral service.
5. The response time to the user is immediate or the turn around time is a day or two.
6. The data in the system are updated continually without great expense so the information is accurate and current, and the information in the system can be modified without undue cost or time.

7. The hot line can provide occupational and educational information not generally included in some delivery system (foreign educational opportunities, external degree programs, internship opportunities, trade and business association addresses).
8. The caller can remain anonymous, receive the information in the safe environment of a home, talk to a person rather than a machine, clarify the inquiry and interact, and return for additional information by calling again.
9. By identifying the sources of the information given, the caller can learn what information is available, where additional services are located, and in the process become more independent in the future.
10. The hot line can be used with callers with low reading levels.
11. Through referrals to counselors, the CIDS can be integrated into existing guidance services.

Disadvantages

1. The consistency of the information must be monitored because of different persons answering the hot line.
2. Success of the hot line depends not only on the information in the system but also on the skills of the hot line answerers in accessing the information and on the communication skills of the hot line answerers.
3. There is a limitation on the amount of information that is reasonable to give a person and for a person to interact with on the phone.
4. Too, there is a danger of overloading the caller with information on educational and vocational opportunities.
5. Referral agencies sometimes do not provide satisfactory services and the hot line is identified with the lack of assistance.

Costs

The primary cost of the hot line for incoming calls is only $245 for ten hours of contact time and a maximum of 600 calls; the overtime for the month of December was ten hours at a cost of $181.35 additional dollars. In addition to these charges, the hot line is using the statewide SCATS system for returning calls when information is not readily available. The charges for these calls will range from thirteen to eighteen cents per minute depending on the volume of university SCATS calls. Unfortunately, the state computer printouts on the volume of calls is about two months behind, so we have no data on these charges. A rough estimate of these charges would be about $50 per month. The personnel charges for the hot line are for two graduate assistants (½ time each) and about ¼ time for a user specialist for supervision, or roughly about $1,450 per month. Indirect and other personnel costs for setting up the system and supervision are not easily determined as the hot line is only part of the project at Virginia Tech.

A Good Alternative for Target Groups

As listed under the advantages for the system, the hot line is a good alternative for target groups because it is accessible; can provide specific information immediately; is of no cost to the user; serves as an I&R for other supportive agencies; is identifying the informational needs of groups not in contact

with educational institutions and existing agencies such as VEC, rehabilitation, Veterans' Administration, and others; reaches those with lower reading abilities; provides the information in the environment in which the client is comfortable, often the home setting; allows for interaction and clarification of information needed; cuts across the sex, age, race, and other barriers; and takes advantage of a currently acceptable means of using toll-free numbers.

Decision-Making Process to Select the Delivery System

Based on information on delivery systems in other states, especially on the Florida hot line, guidelines and standards, cost analysis, consultants, counselors, and circumstances and conditions in Virginia, the recommendations of *The 1980 Feasibility Study for a Career Information Delivery System in Virginia* included a career information toll-free hot line as part of a statewide CIDS. The Virginia Information Coordinating Committee and the VOICC reviewed and accepted the report. The Virginia Tech Project advisory committee, composed of representatives from VOICC, reviewed the hot line proposal, approved its initiation, and made specific recommendations as to the purpose, limitations, information to be included, and the operation.

Unique Features

The unique features of the delivery system are: its availability and accessibility; its information and referral function to help integrate the CIDS into existing guidance services; its ability to reach users in a wide range of existing agencies (VEC, Rehabilitative Services, Adult and Vocational Education, Community Colleges, Proprietary Schools, and other such agencies), as well as users not associated with any agency; its ability to provide a means of interaction with a user in the user's environment rather than in the system's environment; the capability of establishing credibility and support for a statewide CIDS utilizing other delivery means, in a relatively short time; its ability to expand the system beyond that information designed initially in the system to meet unusual user needs; and its potential for reaching users with low reading levels.

User Reaction

Over 540 calls have been handled in less than three months. The log of information requested from the user asks the user how the information received is rated: helpful, no help, or very helpful. Although the validity of such user reactions has not been verified, the assumption was made that the data collected would be more valid than if obtained face to face. Immediate responses have varied. Some callers have indicated positive feelings about having a person rather than a machine answer the phone and supply the information. For example, one caller hesitated and then said, "Are you alive? Is this a real person or a machine?" Many callers verbally expressed appreciation and thanks for the information and satisfaction with the delivery of the information. Counselors have called and indicated their reaction of satisfaction with the hot line's availability for supplementing their information sources.

The dissatisfaction with the hot line has come from users who request information not presently available, for example specific salary or wage information for a specific community or occupation. This is especially evident when users are calling the hot line as the last resort after tapping all other information sources. Initially, the owners and operators of proprietary schools made numerous calls to check out the system, posing as clients with questions. They were not always satisfied with the answers and were insistent that every available level of training be given to an individual and that

written confirmation be provided to the caller. Through training sessions with the hot line answerers, the problems have been ironed out and awareness of the potential problems when the level of training is not specified have been addressed.

Conclusion

In conclusion, from the preliminary data collected over the past two and one-half months since the hot line was first initiated, the typical caller on the hot line is: in the nineteen-to-thirty age bracket; is changing jobs; is a female; has not tried to obtain the information requested elsewhere; has heard about the hot line from the newspaper; rated the information received as very helpful; and was interested in obtaining information on educational and/or job opportunities. Equally as interesting is the variety of callers covering the ages from fourteen to over sixty-five seeking information, such as: How can I become an apprentice in watch making? Can I get financial aid for tools? Where can I get my course work for the apprenticeship program? Or, I am fourteen years old and need a job; can you help me? Or, I am forty-five and have not been employed in twenty years; how do I go about deciding on what job I am qualified for? Who can help me?

The Virginia Career Information Hot Line has served as a delivery vehicle for career information to over 545 callers as of January 30, 1981.

PRINTED MATERIALS

John Marshall, Director
Florida VIEW
Center for Career Development Services

Means of Delivery

Florida uses three major sets of printed materials. *The Florida Postsecondary Directory*, *Florida VIEW in Black and White*, and *The Secret*, a tabloid. The following presentation will address each of the materials separately.

Florida Postsecondary Directory

Information on all of Florida's 330 public and private postsecondary schools is contained in three hardbound volumes, the *Florida Postsecondary Directory*. Material for the directory was taken from the institution portion of the Florida VIEW microfilm program. A computerized program index was developed for and included in the directory.

Advantages

The advantages of having this material available in printed form are: (1) its specific design for use as a reference tool to be used by counselors, media specialists, and librarians, and (2) the quantity of copies that can be produced for users outside educational institutions and agencies, such as chambers of commerce and industrial developers.

Disadvantages

The major disadvantage related to the postsecondary directory is the cost of developing it. This includes the cost of graphics, layout, printing, and distribution.

Cost

The cost to the purchaser is approximately $15 for the three-volume set.

Policy Decision

This document was developed due to a need within the state. A similar document had been used throughout the state. When it was discontinued, the Florida Center for Career Development Services volunteered to undertake the revision of the previous document.

Unique Features

The computerized program listing allows the user access to all programs offering a particular program.

User Reaction

User reaction is good. More orders are being placed than anticipated. The number of copies printed in 1982 will be double that of the last printing. Since users are willing to pay $15 a set they must be satisfied.

Florida VIEW in Black and White

The Florida VIEW microfilm materials have been printed and are contained in a three-ring notebook binder. The original camera-ready copy was reduced so that four 8½x11-inch sheets will fit on one 8½x11-inch page front and back. With this format, each page contains information on two occupations. Over 3,000 job descriptions are contained in the materials.

Advantages

A major advantage is that the printed copy is an option for use with the microfilmed information. The printed version also can provide the user with a take-home copy without extensive use of a copying machine.

Disadvantages

The disadvantage associated with this set of printed materials is that it is relatively expensive to produce.

Cost

The purchase cost of *Florida VIEW in Black and White* is approximately $100 per set. This cost is much less than a microfiche reader or paper copies from a microfilm reader or printer.

Why a Good Alternative

By having a paper version of Florida VIEW, the user agencies have the ability to preproduce copies for various uses. The paper copy can be a resource in the library, a handout in small group work, and a supplement to the microfilm VIEW.

Policy Decision

The uses of Florida VIEW requested that this type of product be developed. Paper copies from a microfilm reader/printer were becoming so expensive that there was a need to consider an alternative.

Unique Features

The unique features of the printed version of Florida VIEW should be compared with the features of the microfilm version. Through this version there is a capacity to include more information with less paper. The user does not need to purchase a microfilm printer to obtain a paper copy, which the client can take home.

User Reaction

User reaction has been positive. The materials have been well received and widely used, not only in Florida's high schools, but also by the many industries in need of trained employees.

The Secret

A delivery system in the form of printed material of which The Florida Center for Career Development Services is very proud is *The Secret.* It is a thirty-six-page tabloid-sized newspaper, which has been extremely popular and effective. Research for the tabloid content was taken from Florida VIEW and from a survey of all postsecondary schools. The design, layout, and graphics were done on a contract.

Advantages

This newspaper is a successful means of delivering information to a large population in a most inexpensive and comprehensive manner. It also provides a great deal of visibility to the center.

Cost

Cost of the newspaper is just seven cents per copy. A thousand dollars was the projected cost of delivery. Problems with dissemination have been encountered, but overcome by dedication and ingenuity of center staff.

Why a Good Alternative

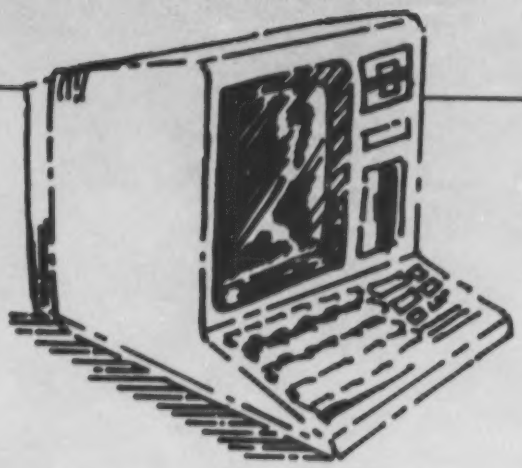
The first printing of *The Secret* reached 500,000 people. It was cheap, interesting, portable, taken home, and it involved the interest and involvement of many parents.

Policy Decision

This media was successful in Michigan and Massachusetts. The funds were available so it was decided to develop the document.

User Reaction

This is the third year of printing the tabloid. Over one million copies have been printed. Each year, more and more agencies want to be included in the guide for statewide exposure. Five hundred thousand copies reach juniors and seniors in high school, CETA clients, postsecondary students, the incarcerated, and many others. The effort has the support of the U.S. Department of Commerce, which will help to make 200,000 copies available to industries and private schools this year.



SECTION III

MICROCOMPUTERS

USE OF THE MICROCOMPUTER IN KANSAS

Randall E. Williams, Director
Kansas Occupational Information Coordinating Committee

Overview

The microcomputer will be used in Kansas as a primary delivery vehicle. After evaluating various alternatives such as on-line and manual delivery, it was determined that microcomputer delivery is by far the most economical and feasible method for delivering career information via computers. In the evaluation, it was found that approximately three-fourths of the on-line delivery costs for other states are for telephone line charges and computer operation time.

Preparation Required to Implement Microcomputers

In preparation for a microcomputer delivery, the first step was to survey the quantity of microcomputers that were currently available in our local and state educational institutions. The purpose was to locate and use existing resources. The issues to be addressed are: (1) type of equipment available by model and manufacturer, (2) current use of the microcomputer, and (3) schedule of availability during the day. All of these issues will have a bearing upon the availability and usefulness for local students to use the microcomputer. In addition, the basic service that must be involved here is one of conversion of software from a mainframe version to one that works on a single or a number of microcomputers. Such an effort requires a fairly substantial amount of resources and expertise. Microcomputers are probably more different from mainframe computers than they are similar with respect to this application. The two main questions to be considered are: how many microcomputers are available out in the field in your state, and can you program software to reach a significant portion of that market?

Advantages

The most obvious advantage is cost. It is considerably cheaper to go with a microcomputer version that involves the locals buying and accessing their own equipment rather than running through a central mainframe that requires administrative support. There is also the advantage of greater convenience in using this particular type of delivery. There are many programs that can be used in addition to the CHOICES software program, which make the computer most cost-effective than the mainframe, particularly in a rural setting. The third advantage is the adaptability of the microcomputer for enhancements. Information on the Kansas enhancements and alternatives will be available once development is complete.

Microcomputer delivery is essential in Kansas to provide computerized career information. Without the microcomputer it would be impossible to serve a number of small rural schools and those that are long distances away from the central administrative support facilities at Kansas State

University in Manhattan. Telephone charges to the mainframe there would be prohibitive. Furthermore, as school budgets decline, it will become increasingly important to have a highly economical career information delivery system. Without such a system, a number of schools would simply be forced out of the overall system.

The microcomputer is highly adaptable and transportable, thereby more convenient to use by comparison to a mainframe terminal. Another important advantage of the microcomputer is its ability to program to the printer only that information vital to the student and counselor needs. This economical use of the printer saves paper as well as time spent in the printing process while the student or counselor uses the microcomputer.

Disadvantages

The primary disadvantage of a microcomputer is the degree of storage that is currently available. It is not a significantly large difference at this point. Kansas microcomputer delivery will include EXPLORE, which is the career search strategy, and SPECIFIC, which is the occupations file. To incude educational information and training information will not involve increasing storage, but adding diskettes. The user who finishes a particular portion of the program will need to remove the diskette and insert a new one related to education or other types of information. An additional disadvantage may be the competition for use of a single microcomputer in one location.

Generally speaking, the best alternative to this potential problem is to encourage the local site to acquire a microcomputer that will be used exclusively or almost exclusively with career information software.

Since Kansas is now required to provide an on-line system, that option will be available at least for the near future to agencies or schools requiring that particular kind of delivery. The cost for the on-line version will be substantially higher.

Cost

In assessing the degree of financial involvement related to microcomputer delivery, there are several aspects to consider. The first is the cost to the user for acquisition of software in addition to the hardware required. The cost of CHOICES software in Kansas is charged at the rate of approximately $1.20 to $1.60 per person per site for the school year or a twelve-month year. This covers the administrative support required to program the disks themselves with all related information. It is estimated that hardware costs to the local user will be about three to four thousand dollars to obtain the necessary equipment. This estimated amount includes a video terminal, a printer, two disk drives, and in some cases, an expansion interface and additional 16K packages to bring the total to 48K of memory in the machine.

Policy Decisions

In considering the selection of microcomputers to deliver career information, it must be determined whether that system is to be used as either a primary or secondary mode of delivery. In Kansas the proliferation of microcomputers was a factor in the decision to use them. It was also necessary to consider the feasibility of economically and effectively adapting our software to this particular medium.

The viewpoints of local users were also taken into consideration before deciding on and planning the transition. Many local sites already had a significant investment in a computer delivery system by a mainframe, so a mix of available systems appeared most desirable for the introduction of the microcomputer system. Other factors included in the decision-making process were: (1) the feasibility of sites sharing a microcomputer; (2) the ability of local schools to provide funds for a microcomputer specialist; and (3) the need for a system specialist to maintain the microcomputer hardware.

Unique Features

The microcomputer can deliver a variety of career information system programs that have the same basic elements. All that is involved is changing the diskettes in the disk drives or adding disk drives in order to access more than one program. In addition, it is possible to make program changes on the spot if you have a programmer available who is familiar with the system. Switching programs is considerably more difficult on the mainframe type of computer delivery. Program maintenance and enhancements are simpler on the microcomputer. For example, Kansas is considering the light pen option as an enhancement to the microcomputer. This option would be more expensive on the mainframe equipment.

User Reaction

User reaction at this point is somewhat limited because Kansas is in a piloting phase. Several sites throughout the state are testing the system from February through May. When piloting is finished, the sites will provide evaluation of the microcomputer delivery with regard to the amount of operation time, satisfaction with the system, and suggestions for improvement. When this evaluation information is returned and collated, Kansas Careers will be in a position to determine refinements of the system based upon the service provided and the users' perceived needs. Over the summer, our project staff will modify the system to correspond to the user evaluation. The polished version will be available for the start of the new school year in September. Sixty locations made application to be considered as one of the fourteen pilot sites, indicating a high interest level in microCHOICES and microcomputer delivery.

MOVING FROM CENTRALIZED SYSTEM TO MICROCOMPUTERS

Elton W. Chase, Executive Director
Washington Occupational Information Service

Overview

The State of Washington is a large state geographically, approximately 300 miles from the northern to the southern borders, and approximately 350 miles east to west. The 1980 census indicates a total state population of approximately 4.1 million. Most of that population is located in the Puget Sound corridor roughly extending from Everett, Washington, north to Olympia on the south. A major population center is located in Spokane and in smaller urban areas such as Clark County, Tri-Cities, Yakima, and Walla Walla, in the eastern part of the state.

Washington Occupational Information Service (WOIS) has been using a centralized, statewide, interactive computing network for delivery of WOIS since 1975-76. However, there are some problems with the statewide computer delivery network that may be summarized as follows:

1. The service center is located approximately 250 miles from the major population center of the state. This means higher phone costs and greater probability of network failure.
2. Experience by WOIS users has been subject to continual interruptions due to computer failure and to telephone line network problems.
3. Increased telephone costs will require significant rate increases by the service center.
4. The burden for marketing computer time and trouble-shooting network problems falls on WOIS staff. The service center does not have field representatives for marketing or troubleshooting.
5. The on-campus users of the Eastern Washington University Computer Center do not feel they are receiving appropriate allocation of computer resources. Consequently, there are internal campus pressures to eliminate the network service.
6. WOIS has not received appropriate revenue from the computer delivery, the computer program has always been a cost factor to WOIS, and it has never been self-supporting. Although the network receives approximately $75,000 revenue per year, WOIS receives approximately $6,000 or less than 10 percent.

The above factors have caused the WOIS staff to seriously investigate alternative computer delivery systems since 1979 and as a result, a major commitment has been made to move to microcomputers with anticipated phasing out of the centralized system by fall of 1982.

Policy Decisions

The first thrust of WOIS is to develop a microcomputer software system that can provide the WOIS users with alternative structured access programs that can readily be run on the Apple II and TRS 90 level microcomputers. A survey of schools indicates an increasing use of these two microcomputers by schools and social service agencies for administrative and teaching purposes.

WOIS has determined it is not cost-effective or feasible to put our total six megabyte disk files onto minidisks and support a total microcomputer information system. Some of the reasons for this decision are as follows:

1. Current size of the files are six megabytes. It would require very extensive modification and changes to restructure the files to be efficiently stored on floppy disks.
2. WOIS does not plan to get into the business of producing hundreds or thousands of floppy disks for distribution and also attempt to update these on an annual basis.
3. Resources require WOIS to limit support to the Apple II 48K one-disk system at the present time. As resources are available, a TRS 80 system may be supported with accessing strategies only.

WOIS is planning, where possible, to utilize existing microcomputer accessing strategies that have been developed by other states such as QUEST, CHOICES, CCIS, and the like. These will be considered as add-on items available to existing users of the WOIS information system. The availability of the WOIS information files will be delayed until less expensive fixed-disk storage of large capacity is economically available for microcomputer users.

The second thrust in the use of microcomputers is the development of a WOIS system for larger 16-bit microcomputers that are close to the level of a small minicomputer. We have determined the cost-effectiveness of putting our system on small minicomputers that would be located in local dial-up areas in selected areas of the state. We anticipate that approximately six minisystems ranging from four-port to fifteen-port capacity will be sufficient for the needs of WOIS users statewide. These would have a minimum ten-megabyte disk file capacity and contain the entire WOIS information system and files. One of these systems would also be the host system for the WOIS system and used for updating and development of new information files. Users would either directly access the minicomputers on a fixed monthly rate basis for both the accessing strategies and the information files, or they would have the option of running the accessing strategies on Apple II equipment and then using the Apple as a terminal to the minicomputer to access the entire information files.

Considerations

When investigating microcomputers, the following questions must be considered:

1. What manufacture and size microcomputers are the CIDS/CIS willing to support with software and information files?
2. To what level is the CIDS/CIS willing to compromise the integrity of the system? For example, will you provide just an accessing strategy and occupation files, or will user agencies be required to also acquire educational program and school files; will these be tied together as an integrated system?

3. Will microcomputer programs and information files be produced and supplied by the CIDS/CIS? How will quality control be assured? How often will files be updated and renewed?

4. What steps will be taken to prevent gross duplication and bootleg distribution of the system?

5. How will the CIDS price the microcomputer alternatives?

6. What impact will the microcomputers have on existing delivery systems and at what rate will the shift take place?

Many of these considerations are especially critical to those states that must continue to function on a self-supporting basis without state or federal agency subsidy.

Staff at WOIS think that the microcomputers are drastically changing the whole concept of providing career information, and we must begin to think in terms of more innovative ways to format and deliver our information that best utilizes the capabilities of the microcomputer.

It is quite probable that in the next three years, it will be technically possible for agencies to have a $3,000 Apple II 48K microcomputer attached to a $750 videodisk playback machine capable of handling our largest information files and also to intersperse video short clips of occupations, educational programs, and educational and training institutions.

The days of the centralized system in the State of Washington are numbered due to technical and economic reasons. The microcomputers will significantly reduce the data processing costs for WOIS user agencies and provide greater access to career information by students and clients in the state of Washington.

MARKETING, SERVICE, AND MANAGEMENT OF MICROCOMPUTERS

Fred Beisse, Manager
Oregon Career Information System

Overview

The Career Information System (CIS) began to investigate the potential of microcomputers in the delivery of career information two years ago. On one hand, with microcomputers a fixture in many schools and social service agencies, it would appear to be a simple task to make at least some part of CIS available on a microcomputer. On the other hand, only recently has the amount of disk storage available on microcomputers become sufficient to store the full information files, which can range from three to eight million characters in various CIS states. The purpose of this paper is to report on the CIS microcomputer project, and discuss some marketing, service, and management issues of microcomputers as a new career information delivery system.[1]

The implementation of CIS on microcomputers is a two-phase project. During the first phase, a version of QUEST, the CIS occupational search strategy, has been implemented.[2] The program, called "micro-QUEST," is similar to the needlesort kit, in that it allows users to sort through occupations and guides users toward books of information much as the needlesort system does. The current versions of the programs are written in APPLESOFT BASIC and run on an APPLE II microcomputer with 48K of memory, a display screen, one or more floppy disk drives, and a printer. The cost of this equipment is $3000 to $3500.

The second phase of the project will implement a full feature "micro-CIS," which is planned to operate on a microcomputer equipped with ten million characters of hard disk storage, in addition to the equipment described above. A hard disk configuration will permit access to all CIS information files. The cost of a microcomputer with that much disk storage is $6500 to $8500. Micro-CIS is planned to be available fall, 1981.

The micro-QUEST system is operational. It offers a microcomputer version of the occupational search strategy, but relies on the occupational information books for career information exploration. It is undergoing extensive testing in laboratory and in field conditions this winter.[3] The dissemination schedule to user sites in Oregon and to other CIS states will depend on the results of field tests. That dissemination is expected early this spring. First, we need to be sure that the micro-QUEST system lives up to the standards set by its predecessors, the needlesort kit and the computer terminal delivery systems.[4]

Characteristics of a Microcomputer Delivery System

As a candidate for a career information delivery system, microcomputers offer several advantages over existing delivery technologies.[5] The initial cost of a floppy disk system is competitive with the cost to an agency of the annual lease of a computer terminal and the costs of accessing CIS

on a time-shared minicomputer. Where a time-shared computer is accessed over long-distance telephone lines, or where computer charge rates are high, stand-alone microcomputers can offer substantial economies, especially over a three- or four-year period.

The equipment can be used on a table top, with no special electrical or air-conditioning requirements. Under controlled circumstances, the equipment can be moved from one location in a user site to another (or even from one site to another). Microcomputers are at least as interactive as time-shared computers with printing terminals, and therefore are an attractive delivery method to guide users from task to task. Also, a microcomputer equipped with a printer can provide lists of occupations that users can carry away for subsequent exploration in a way needlesort technology cannot. So there are more reasons to implement a microcomputer delivery system than their mere existence in so many schools and agencies. However, their existence probably does account for some of the current interest in the potential of microcomputers as a delivery system for career information.

Microcomputers are not, however, without drawbacks, which will limit their universal acceptance as a CIS delivery system. The cost of a hard disk system is beyond the budget resource abilities of many schools and agencies. (Although in some sites, CIS coordinators have reported that CIS availability will help justify microcomputer acquisition as one of several educational applications that can be offered.) Those who are attracted to a moderate cost delivery system, which combines both the QUEST occupational search strategy and the information files in one medium, will continue to see computer terminals as the system of choice. Those who need a low-cost delivery system, or who are particularly attracted to the advantages of the needlesort card decks in intensive counseling situations or where the visual nature of the card-sorting process is desirable, will continue to see the needlesort kit as the system of choice. In other words, microcomputer delivery of career information is complementary to other delivery systems, and is not designed to compete with, or replace, existing systems. It is intended to offer existing users with another delivery alternative, and to offer CIS to users who have not been attracted by existing delivery systems.

Microcomputer Design Considerations

Microcomputers pose several challenges to system designers and implementors.[6]

1. Since time-shared computers rely on slower printing terminals, use of the display screen permits more effective user interaction. The number and quality of user help messages have been increased. New ways of interacting with QUEST can be developed and researched. Micro-QUEST, for example, displays the entire question text on the screen, reducing a user's dependence on the user's handbook.[7] New key words have been added to QUEST, including the ability to review answers to questions.

2. Where occupational books are the principal source of information, ways must be devised and tested to ensure that users make easy transitions from the attractive technology of the microcomputer to the traditional book medium for information. The ability of the microcomputer to interact with and motivate the user is central to an effective transition between media. If users see micro-QUEST as just another computer game, microcomputers will not be an effective tool in the information delivery process.

In addition, there are a number of technical issues involved in the implementation of CIS on microcomputers.

3. If transportability of CIS programs and data from one brand of microcomputer to another are desirable, the current incompatibility of various systems is a design consideration. Incompatibilities in equipment features such as data representation and format on disks, screen sizes, printer capabilities, memory sizes only compound incompatibilities between languages and operating systems in the popular brands of microcomputers. A system designed to use only the lowest common denominator of features might be transportable, but would not be very powerful. A decision to implement a system on only one brand of microcomputer ignores the already substantial equipment investment many schools and agencies have made in other brands.

4. Distribution of CIS programs and information files on microcomputers thrusts CIS state systems squarely into the middle of the industry controversy over piracy of programs. The ability of users to easily and rapidly make unauthorized copies of diskettes threatens control over the quality of CIS information, fosters use outside traditional guidance and career education programs, and has direct consequences for the ability of the CIS state organization to maintain the microcomputer version as a financially viable alternative. The tools available to combat these threats include several kinds of intimidation, penalties for violators, and the prospects of new developments, which would render diskettes uncopyable, implement program use protection or information inscription techniques, or provide better legal protection of computer products than exists today.

5. While maintenance of the information files associated with micro-QUEST poses no particular technical problem, transfer of all CIS information files, and their subsequent maintenance and dissemination to other sites, are problems of another order. Several new products are available, which make the problems more manageable. They include industry-standard magnetic tape drives and controllers for popular types of microcomputers, programs that permit transfer of information between previously incompatible diskette data formats, hard disk systems that are compatible with several kinds of microcomputers, and devices that permit high-speed data links between minicomputers and microcomputers. Floppy disk media can be used as a dissemination vehicle among compatible machines, once the information files have been down-loaded from the computer on which information updating is performed.

Implementation Policies:
Hardware, Pricing, and Marketing

The CIS microcomputer project is organized as a research and development project within CIS. The project group includes staff members with experience in CIS information development and presentation, microcomputer hardware and programming, and legal and marketing strategies. The project group is aided in their tasks by a national advisory group that includes Peter Weyhausen (EUREKA!, the California CIS), Elton Mendenhall (Nebraska CIS), and Les Janis (Georgia CIS). The advisory group has been especially helpful by describing special needs in their CIS states, and by surveying the kinds of microcomputer systems likely to be available to schools and agencies in their state.

The Oregon CIS Consortium Board met to see a demonstration of micro-QUEST, and to consider a number of policies about the implementation of micro-QUEST in Oregon and its integration as an alternative delivery system. The board considered and adopted several policy recommendations on hardware, pricing, and marketing.[8] These recommendations are summarized in the following paragraphs.

Hardware

1. Recommendation – Micro-QUEST will be distributed in versions for APPLE II and Radio Shack TRS-80 Model I microcomputers.

The factors considered were the popularity of these systems in surveys by CIS and by the Oregon Department of Education, and the statewide availability of units and service to schools and agencies. Versions for other popular microcomputers could be developed if need dictates.

2. Recommendation – Minimum hardware requirements to run micro-QUEST include the following:
   a) Microcomputer with 48K of memory
   b) One (or two) floppy disk drives (minimum of 80K of characters on-line)
   c) Display screen (16 lines by 64 columns or 24 by 40), and keyboard
   d) 80 column printer (desirable additional hardware)
   e) Second floppy disk drive (desirable additional hardware)

While one floppy disk drive is sufficient on an APPLE II system, two drives are required on a TRS-80 to meet the 80K character requirement.[9] A second drive on an APPLE II is desirable to support planned enhancements in subsequent versions of micro-QUEST. A printer is strongly recommended.

During phase 2 of the microcomputer project, which will implement the full-feature CIS, these floppy disk systems can then be upgraded with the addition of a ten-million character hard disk. While neither APPLE nor Radio Shack offer a hard disk yet, both are expected to, and several manufacturers (Lobo, Corvus, Morrow Designs, American Computer, and others) market hard disks that can be attached to popular systems.

3. Recommendation – CIS's role in the installation of micro-QUEST will be limited to software and information maintenance. CIS will not sell or service hardware.

CIS could act as a microcomputer dealer/distributor. Somewhat lower hardware prices could be passed on to schools and agencies, and CIS states could conceivably generate revenue through hardware sales. Problems with equipment vendors, delivery schedules, and the need to maintain staff with hardware and servicing expertise all argue against a direct role for CIS in the hardware area. State CIS organizations can maintain a consulting service and an information clearinghouse for equipment purchasers who need assistance. Mail-order dealers will provide substantial discounts where price is important; however, local support of hardware for many schools and agencies is probably more important than initial equipment costs.[10]

Pricing Micro-QUEST

1. Recommendation – Like other delivery systems, micro-QUEST (and micro-CIS) will be priced to cover its own costs. These are the micro-QUEST cost components:

Software	– micro-QUEST development; text message file formatted for display screen; information file maintenance; system enhancements in micro-QUEST
Distribution	– diskettes; occupational information, programs of study, and school information books and updates; installation instructions; diskette mailer; and postage both ways
Servicing	– contract administration; materials distribution; troubleshooting user problems
General	– equipment amortization; general management and overhead

2. Recommendation – Price will be set at a level high enough to avoid rapid fee increases due to inflation or unexpected costs.

Several cost factors, including inflation, are not easily predictable. The initial price should be guaranteed for at least eighteen months.

3. Recommendation – Fees will be based on a price per microcomputer.

Current needlesort and computer delivery systems are priced per set or per computer installation. This policy is consistent with existing practice. The alternative of basing fees on a price per site or per contracting agency could invite unauthorized copying of diskettes and piracy. Each set of micro-QUEST diskettes will be licensed to the serial number of the microcomputer on which it operates.

4. Recommendation – Fees will be set so user sites are not encouraged to shift rapidly from one delivery system to another.

The recommendation follows from the objective of treating micro-QUEST as a complementary delivery system alternative, and not as a cost competitor to other systems. (The delivery system part of the needlesort kit use is about $100 per year. The delivery system part of the time-shared mini-computer alternative is $2300 per host installation.)

5. Recommendation – Quantity discounts will be provided to individual user sites.

Pricing should encourage sites with several microcomputers to use several machines.

6. Recommendation – The initial price of micro-QUEST will be $360 per microcomputer for the first copy at a user site. Up to three additional copies at the same user site will be $250 each.

This price follows from an analysis of the factors in recommendations 1 to 5.

Marketing and User Services

1. Recommendation – Training on micro-QUEST use will be integrated into the CIS fall inservice training sessions.

Since micro-QUEST is an alternative delivery system, its training requirements should not differ significantly from training for other systems. Most schools and agencies that implement micro-QUEST early will be existing CIS users who already have microcomputers, so training needs should be minimal since well-written, explanatory user materials are part of the product design.

2. Recommendation – Contract that accompanies micro-QUEST package will license a specific diskette to operate on a microcomputer with a specific serial number.

The contract will define parties (names and addresses), the site boundaries, mutual responsibilities of parties, ownership of micro-QUEST, and legal jurisdiction; and will warrant the product, protect the QUEST copyright, and license the user to use, but not to copy, the diskette.

3. Recommendation – The micro-QUEST diskettes and information books will be distributed semiannually.

The distribution schedule will be similar to that established for needlesort kits. The distribution package will include both a micro-QUEST master diskette, and a backup diskette.

4. Recommendation – Several types of materials will be part of the micro-QUEST project: user materials, marketing materials, and legal materials.

CIS will develop materials for use in Oregon and as prototypes in other CIS states, including information brochures, press releases, and technical assistance information on equipment purchases. A micro-QUEST user's handbook will be prepared. Legal materials will include, in addition to the Oregon version of the contract, a memorandum on copyright law as it applies to microcomputer software and micro-QUEST.

5. Recommendation – Marketing will be aimed at the following:

   a) Existing users, including rural schools and agencies, and time-sharing users for whom costs are greatest.

   b) Partial service users, including four-year colleges, vocational rehabilitation and private counseling agencies, and selected schools and education service districts.

   c) Nonusers, including libraries, employment services, and workers compensation offices.

Since micro-QUEST is a research and development project, initial dissemination will focus, although not exclusively, on existing CIS users who have considerable experience with both QUEST and microcomputers. A second target group for marketing attention will be schools and agencies that underutilize CIS, and may find that micro-QUEST fulfills a gap in their delivery system needs.

Although many of the above policy areas address micro-QUEST specifically, some have implications for micro-CIS. While design specifications and the policies to implement phase 2 project objectives are future tasks of the project group, two issues under consideration are worth attention here. First, an alternative to CIS information file access on hard disk is to develop a system that accesses the information files on floppy diskettes, and uses less expensive hardware similar to that on which micro-QUEST operates. Due to the size of the information files, even the highest density floppy diskette formats available today would require a large number of diskettes to contain all the files. These diskettes would be handled almost continuously by inexperienced users as the program instructed users to make the transition between various information files. The amount of diskette handling seems a poor feature of a system intended for use by inexperienced end users. The relative destructability of the diskette media is a factor in limiting the amount of handling the system requires. The tentative conclusion is that a hard disk implementation of micro-CIS is the most worthwhile approach. The cost of ten-million-character hard disk drives and controllers (currently about $5000) is forecast to drop, especially as vendors of popular systems incorporate the Winchester disk technology in their mass market products.

Micro-QUEST is written in the version of BASIC available on the microcomputers on which it operates. While the size and complexity of the programs and information files permits that approach, those same considerations dictate that micro-CIS be written in a more transportable language. Although no irrevocable decisions have been made, logical candidates would appear to be some type of operating system which enjoys widespread adoption such as CP/M (a product of Digital Research), and an implementation language such as Fortran or Pascal. Fortran has some appeal, since much of the file access logic in the existing Fortran version could be used in micro-CIS.

Findings from Preliminary Test

While more extensive laboratory and field tests are underway, preliminary results from use of micro-QUEST to date have found that users like the system, especially its highly interactive nature, and the variety of user messages. Users do not find it a difficult system to operate, although some messages have been clarified, and changes have been made to the design to incorporate feedback from users. Some users find the APPLE II display screen difficult to read, since characters are all uppercase, and there is little space between lines. The forty-character screen line means some messages must be split between lines in less than optimal places.

When the display screen fills with information, micro-QUEST pauses, and instructs users "TO CONTINUE, PRESS THE RETURN KEY." Thus, the RETURN key, which was used to suppress information display on some CIS terminal systems, now takes on the opposite meaning. This is a possible source of confusion.

Generally, the feedback has been valuable, and the system designers add daily to the list of desirable micro-QUEST features. Many of the new design features are genuine enhancements to the CIS system, and not merely bugs or implementation alternatives.

Notes

1. Several earlier project reports included *Issues In a Microcomputer CIS Delivery System*, February, 1980; and *CIS On a Microcomputer: A project report*, August, 1980 and November, 1980.

2. QUEST, the Career Information System occupational search strategy, is copyrighted by the Career Information System, University of Oregon, Eugene, Oregon, 1980.

3. The field tests will include a social service agency that serves disadvantaged youth. That portion of the field test and evaluation is funded as part of a joint project with the Northwest Regional Education Laboratory in Portland, whose staff is collaborating on assessment aspects of the microcomputer project.

4. See *Standards for the Use of the Career Information System*, Oregon CIS, Eugene, Oregon, July, 1976 revision; see also *How CIS Meets the ACSCI Standards of a Good Delivery System: Key Points and References*, Oregon CIS, Eugene, Oregon, no date.

5. For a more complete discussion of several alternative delivery systems, see *Delivery Technologies in the Oregon Career Information System*, by Fred Beisse, a companion paper to this, also prepared for the Technological Alternatives Conference in Columbus, Ohio, February 1981.

6. *CIS System Design Specifications*, Oregon CIS, Eugene, Oregon, 1981, contains a complete specification of the Career Information System.

7. *Exploring Careers: Needlesort User's Handbook*, and *Exploring Careers: Computer User's Handbook*, Oregon CIS, Eugene, Oregon, 1980.

8. The full text and discussion notes can be found in the *CIS Board Notebook:* Minutes of the January 19, 1981 meeting.

9. For a summary of the characteristics of popular microcomputers, see *All About Personal Computers*, Datapro Research Corporation, Deltran, NJ, May 1980.

10. Advertisements of mail-order discount equipment suppliers can be found in magazines aimed at the personal computer market, including *Byte*, *Interface Age*, and *Microcomputing*.

TECHNICAL CAPABILITIES AND COSTS OF MICROCOMPUTERS

Ron Myren
Wisconsin Career Information System

Overview

The Wisconsin Vocational Studies Center has three microcomputers in use and will likely purchase additional systems in the next two years. Our main system is a CROMEMCO System Three with two dual-sided, dual density floppy disk drives, each having the capacity of 1.25 meg. The system also has an 11-meg Winchester disk for extended storage. We are operating under CROMEX, which is a multiuser, multitasking operating system (UNIX LIKE) that requires 64K of RAM for the system and an additional 64K of RAM for each user.

Preparation

Before making a decision to invest in a microcomputer we tried to anticipate the kinds of service the center required and, more importantly, the availability of software and hardware support for the different systems available. We quickly discovered that there is an abundance of microcomputer manufacturers and each system has a particular feature that makes it desirable, but few systems are well supported. Basically, what the center required was a system that would process characters. We had a number of large computers available for analytical tasks, but those machines tend to be inefficient when used to process words. For this purpose the 8-bit microcomputer is ideal, but we were unable to purchase the specific programs to satisfy our requirements.

The first software product developed in-house was a document processor, more commonly called a data base manager. The development has taken a year and is near completion. We patterned our product after existing systems like JPLDIS, SYSTEM 2000, and WISE. The program is called OMDORS for Omni Document Retrieval System and is a general document processor. It is table driven, and key words or phrases are processed for rapid retrieval. Because the program is table driven it can process different kinds of materials. We presently have three major OMDORS data bases. The first was developed for the Wisconsin Occupational Information Coordinating Committee (WOICC) and contains about 450 documents relating to information available, which might help staff and local service groups. The second contains 800 documents dealing with CETA programs, and the last contains 10,000 library references for the center's free loan library.

The second major program being developed on the CROMEMCO is a mailing label package. The center has a file of approximately 20,000 mailing labels that we maintain for a number of different organizations. We now have those labels on a HARRIS minicomputer, which is available through another campus organization, but it is costing about $800 per month for storage and computer time. Our staff provides all update functions. We hope to have the label package completed and labels transferred during 1981.

Advantages and Disadvantages

The only real advantage of a microcomputer over the minicomputer or large system is that of cost and possibly being capable of operating in an office environment. The disadvantages are hard to explain. Microcomputers have been around for only a short time and much of the software needs to age. Operating systems are primitive, but each year they improve. Hardware needs tender loving care, but each year the systems become more reliable. The major disadvantage is that systems are oversold and many microcomputer manufacturers and retail dealers have gone out of business leaving the user with useless equipment.

Cost

Equipment costs are almost as hard to discuss as the product itself. The equipment will cost what you want to pay, but do not expect to get a complete system for the advertised price. The following price list is suggested as a guide to what might be expected:

Computer with 64K of RAM System should have two floppy disk drives and power supply	$4000–8000
Winchester hard disk will range from 3 to 70 meg capacity	$3000–8000
Disk controller	$ 300–1200
Letter quality printer	$2000–3500
Production printer, 1200 baud	$1800–3000
Video display terminal	$ 900–2000

Total cost could be $17,000 for an average system plus software.

COMPUTERS AND EDUCATION

Ludwig Braun, Apple Computer Inc.
presented by Deac Manross*

Overview

Many of us "old-timers" consider ourselves missionaries preaching the gospel of computers in education. For the first time in twenty years, we see the possibility that the message will reach the students in this country in numbers large enough to matter.

Beginning about 1960, there was a concerted effort by many people to explore and to demonstrate the value of digital computers in learning environments. There were Pat Suppes and Vic Bunderson with Computer-Assisted Instruction (CAI); Don Bitzer with PLATO (the most comprehensive computer-based learning tool ever devised); John Kemeney and Tom Kurtz, whose BASIC and time-sharing made computers available to many of us for the first time; Bob Albrecht, Dragon Emeritus of People's Computer Company and champion of children on computers; Bill Huggins, who very early perceived the power of graphics and of simulation in learning; Seymour Pappert, whose LOGO has demonstrated that even young children are capable of developing and implementing complex algorithms; Alan Kay, whose *Dynabook* is a beacon showing the rest of us the way; Tom Dwyer, whose SOLO and SOLOWORKS gave youth unusual and powerful learning experiences; and Mike Visich and myself in the Huntington Computer Project, which demonstrated the learning value of computer simulations in a variety of disciplines.

All of these efforts, and many more, have been largely ignored by the educational community. Even now, two decades after it all began, computers affect the learning experiences of not more than 2 percent of the high school students in a meaningful way. There are many reasons for this, but the most important are:

Cost

Cost, being spent for textbooks, films, slides, and so forth, is measured in pennies per student per hour. School systems have difficulty justifying the expenditure of two to five dollars per student per hour for computing, no matter how great the benefit.

Reliability

Because of the complexity of interconnection of most time-sharing systems (the primary source of computing power until recently), interruptions of service were too frequent for most teachers to accept. The wasted class time and embarrassment caused by a system crash during a carefully planned class period need be repeated only two or three times before most teachers reject computers.

*Deac Manross of Apple Computers Inc. was present at the conference and gave a more technical presentation than is written here.

Flexibility

Because of the size and weight of computers and peripheral devices, and because of the necessity for telephone connections, computer use could only occur in previously planned locations. The learners had to be brought to the computer, rather than having the computer brought into the learning environment.

Lack of Courseware

The development of courseware (software focusing on curriculum objectives) requires an amount of time not available to most teachers and expertise in a range of areas beyond the training of most of us. This means that the teachers must rely on others to produce the courseware needed for these classes. Because of the small market, there has been little commercial interest in producing courseware, and the burden has fallen largely on the federal government to support its development. Federal funds in this area have been limited and, in recent years, almost nonexistent. As a consequence, there is now more excellent courseware available but only in very limited quantities.

Personal Computer

Fortunately, we are in the midst of a computer revolution, which started in 1975 with the announcement of the Altair 8800, the first microcomputer available at low prices and in relatively large quantities. In the three years since, there has been a bewildering array of new product announcements, culminating in the personal computer—a microcomputer small enough, inexpensive enough, and simple enough to use that it can be thought of as a personal consumer product.

The personal computer offers educators, for the first time, the opportunity to realize the promise that has been demonstrated over and over during the last two decades of effort. Its purchase cost is so low (less than $1,000 in some cases) that its per-student-hour cost is under twenty cents when amortized over a four-year life; its reliability is dramatically better than that of previous computers because it uses large-scale integrated circuits that require few external connections; and it is so flexible in use because of its small size and weight and because it is a complete self-contained computer, that we can use it in any classroom, office, or home without special planning. It even is conceivable that school systems and local libraries will make arrangements to lend personal computers to students or to local residents as they now do with books, paintings, records, and video cameras.

In addition to solving the problems that have inhibited the penetration of computers into education, personal computers have capabilities few of us even dreamed about until three years ago. These include: graphics (including color in some cases); speech generation and recognition; music generation; and real-time interactions with the real world, which permit the computer to control external devices and external devices to control the computer. (This capability is especially attractive for the education and environmental improvement of handicapped people.)

Unfortunately, despite the marvels of modern personal computers, there is no solution yet to the fourth problem mentioned previously—lack of courseware—although the future looks bright even here. There are already over 50,000 personal computers in the hands of consumers, with that number increasing at a rate above 10 percent per month. This growth rate has produced two beneficial effects: a new cottage industry has emerged to respond to people's hunger for programs to use on their new personal computers; and the federal government has taken notice of this growth and has begun planning to resume its role as catalyst for courseware development. Both of these forces taken together should begin to eliminate this problem and should generate enough commercial potential that publishers will take over within the next five years.

TRS-80 COMPUTERS

Ron Moore
Radio Shack

Overview

A computer is a tool for managing data. It can work with numbers and alphanumeric data like names, words, addresses, and stock numbers. A computer can be programmed to repeat the same function over and over. It can logically evaluate information given to it, and act on its own findings. It can store huge volumes of data for future use, reference and updating, and even "converse" with its operator. A computer is an extension of the human brain. It is to the mind what the lever is to the arm—a machine capable of multiplying effectiveness. It can free you from tedious, repetitive work, which does not require judgment. It can provide facts and figures with lightning speed, giving you more time to exercise your judgment thoughtfully.

TRS-80 Is Easy to Use

Each TRS-80 comes ready to be programmed from a prerecorded cassette tape, a disk, or its own keyboard. A "program" is a set of step-by-step instructions telling your TRS-80 what you want it to do. There are over 100 ready-to-use programs in our fast-growing library—covering personal, educational, business, and entertainment applications. If you would like to learn to write your own programs, Level I is an easy-to-learn, plain English BASIC programming language. The Level I users manual includes a beginner's course in BASIC that will have you "talking" to your computer in no time.

Support

We have you covered—with over 7,000 locations supporting TRS-80. In the United States alone, there are more than 6,000 Radio Shack stores and dealers where you can order TRS-80 equipment. In addition, we have eighty-five Radio Shack Computer Centers staffed with experts who will assist you with sales, service, advice, and even classroom training. Also, 120 company-operated service centers service only our TRS-80 systems. Ask for information about Carry-In and On-Site Service Agreements in your area. There is even a special "hot line" phone number for TRS-80 owners. Owners also receive our *Microcomputer Newsletter,* which is loaded with up-to-the-minute information.

Expandability

This means you can enjoy the TRS-80 system you need right now, without paying for more computer than you need. Later, as your needs grow or change, you can add more capacity through plug-in accessories. Our goal: to sell you what you need, not more, not less.

Value

Our Level I, 4K model I, was introduced at $599 in 1977. Today, despite inflation, the price is $499. The reason for the cut is economies of scale and our own manufacturing facilities. All five TRS-80 models, for the same reasons, offer tremendous value.

TRS-80 Goes to School

More TRS-80 systems are used in classrooms than any other type of computer. Radio Shack supports educators with teacher guides, course materials, and our exclusive network controller. Our national bid department will quote on bid invitations and RFPs.

The TRS-80 is available in five models. Model III is, in most cases, the best choice for delivering occupational information at the high school level. It is completely self-contained in a desk-top unit. Like the more expensive Model I, it is also fully expandable—you can start with a 4K Level I system and let it grow with your needs. There is plenty of room inside for more memory, communications interface, and two double-density disk drives. Also, most Model I software will run on Model III, so there are already hundreds of applications you can put to use. Model III is available with either Level I or powerful Model III BASIC and is priced from $699.

WINCHESTER DRIVES

Buddy Bruner, President
Omega Information Systems

Information Storage

Computer information was first stored on cassettes, then on disks—both hard and floppy, which can change in size and shape with variations in temperature. The hard disk can write more closely and hold more information. Users wanted this advantage, plus fast retrieval, low cost, reliability, and large storage capacity. The "Winchester" disk drive meets all these standards.

It is sealed from the atmosphere, making it impervious to destruction. It copies. It will store the data contained on 100 diskettes and can copy each diskette in about three minutes. There is also a Winchester disk that can store 200 diskettes, and a model capable of storing 400 diskettes will soon be available.

Copies from the Winchester disk can be made on magnetic tape, which is expensive. Copies can also be made on a video tape recorder (100 million bytes of information in ten minutes) at relatively low cost (about $20).

One Winchester drive disk can easily be shared among several computers, because twenty or forty million bytes can obviously serve a lot of people at the same time. Winchester drive disks are available for all kinds of computers. They currently cost about $5,000 for one with a ten- to twenty-million-byte storage capacity, but their cost is coming down with the increase in their use.

The development of the Winchester drive is of major importance to the computer industry. It makes microcomputers as fast and strong as mainframes, and it means that microcomputers are no longer limited in storage capacity.

Corvus

Apple Computer, Incorporated has developed the CORVUS Systems. The CORVUS 11AP Disk System is a ten-million-byte disk add-on for the Apple computer.* The CORVUS 11AP is an intelligent peripheral that adds cost-effective mass storage to the Apple microcomputer, while maintaining total compatibility with existing hardware and software. The system package consists of the IMI 7710 "Winchester" disk drive with CORVUS intelligent controller, a complete power supply, and an intelligent module for the Apple, consisting of an interface card and its associated software.

* Apple is a trademark of Apple Computer, Incorporated.

The ultra-compact ten-megabyte disk drive is a technology leader that provides eleven million bytes of unformatted magnetic storage in less than two-thirds of a cubic foot of space. The unit features a closed loop servo. This assures accurate and rapid read/write head positioning independent of temperature and other environmental factors. There are three data surfaces and one servo surface on two eight-inch platters.

The drive electronics are contained in three 7.5 inch by 10.5 inch printed circuit boards that are enclosed within the drive housing. This housing also contains a fourth PC card of the same dimensions, which is the CORVUS intelligent disk controller. This controller is based on the 2-80 processor with 16K of random access memory. Firmware for this controller provides such features as:

- Sector buffering
- Read after write
- Error recovery with automatic retries
- Error statistic monitoring and diagnosis
- Transparent formatting with CRC error detection
- High speed data transfer utilizing DMA

The CORVUS system interfaces to the Apple processor by means of plugging in a standard interface card. This interface and associated controller can support four disk drives in a simple daisy-chain. The interface card provides a buffered parallel I/O that is capable of transferring data at a rate of over fifty kilobytes per second. The system software is contained in a two-thousand-byte read-only memory, which adheres to all Apple standards for such a device.

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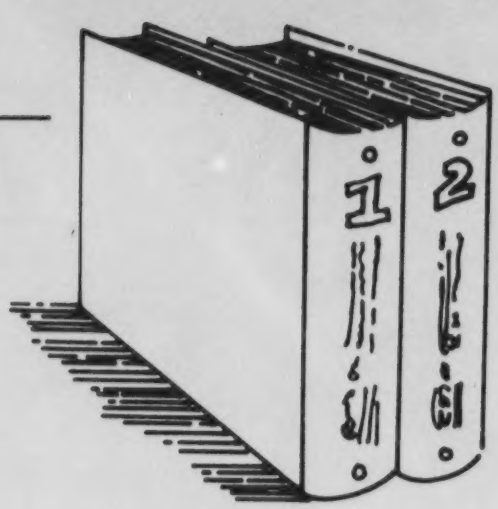

SECTION IV

SPECIAL PROGRAMS

TALKING COMPUTERS

Peter Duran, President
ARTS Computer Products, Inc.

Overview

ARTS serves the handicapped in business, education, and daily living by means of its computer accessibility aids. A major item that ARTS has developed is Orator, the talking computer.

Development of the talking computer, Orator, began in 1974 using IBM equipment. In a vocational education program in Massachusetts, seventy students who were considered uneducable were able to acquire basic skills through the use of a talking minicomputer. It has been refined to a point where it now effectively spells words, translates them to phonic sounds, and produces intelligible speech. The first Orator was available in December 1980. There are, as of February 1981, fifty in use.

Audiences for the Orator

The Orator is used mainly by the blind and visually impaired. However, it is also ideal for persons with low level reading skills who need computer information. Paraplegics also can use the Orator.

Talking terminals also have many uses for everyone. Some areas in which their advantages are being recognized are medicine, assembly line production, and fire warning. Beyond the Orator's role as an educational tool, the talking computer can provide entertainment, accessibility to everyone, and familiarity with computers, which themselves will soon relate to one job in every ten.

How It Works

The Orator is a combination of computer hardware and software produced by ARTS Computer Products, Inc. It enables a computer to speak its output, rather than printing it on a terminal screen or sheet of paper.

There are two ways of producing computer speech. In the older, "stored dictionary" approach, human speech is actually recorded, and stored in the computer's memory. This method produces a finite vocabulary (usually 20,000 words or less) that the computer can speak. In the "synthetic" speech method, there is no dictionary of words for the computer to choose from. Instead, the computer stores some 300 rules that help it analyze English pronunciation. It will look at any group of characters in the context of these rules, and then produce the appropriate sound mechanically. Synthetic speech offers an unlimited vocabulary using much less computer storage space than the stored dictionary method. The quality of speech is dependent on the quality of the software and hardware used.

The Orator Speaks Whole Words and It Spells Each Character

When set in word mode, the Orator will pronounce any expression of two or more characters that has at least one vowel, does not have any punctuation, numbers, or special characters within it, and is surrounded by break characters such as space or tab. Any expression that does not meet these criteria will be spelled.

Of course, there are some times when spelling is preferred. When the Orator is set to the spell mode, the user can learn the correct spelling of a word, or distinguish between homonyms. As a user feature, the user may switch between full word and spelled speech at will.

The American Standard Code for Information Interchange (ASCII) contains the full upper and lower case alphabet, the ten digits, punctuation, and other special symbols. Orator speaks them all.

Features

- Echo. The Orator can speak material as it is being typed, so the user may be sure of what is being entered. As a feature, the user may choose to hear characters, words, or lines as they are being entered. At the character level, the echo feature is an excellent teaching device for the novice typist. At the word or line level, the Orator can help identify typing mistakes and verify commands before they are sent to the computer.

- Rubout. The ASCII character rubout permits the erasure of the last character(s) typed. Successive rubouts erase characters from right to left. The Orator will echo both the rubout character and the character being deleted.

- Proofreading Capability. The Orator can help ease the exacting task of proofreading. When the user is reading, only the content of the material is important. However, when the user is proofreading, it is also important to note capitalization, punctuation, and format. To accommodate this need, the following approach is taken. The ASCII characters are divided into convenient groups. These are: lowercase alphabet, uppercase alphabet, punctuation marks, break characters, and symbols of grouping such as parentheses and brackets. At any time, the user is free to select which of these groups are spoken and which are silenced.

How to Use the Orator

The Orator acts as a filter through which information flows between the user and the computer. There are four modes of operation that, when used according to the specific needs of the situation, will allow the handicapped users to function as efficiently as their sighted coworkers.

Format mode. Used to communicate with the Orator directly. Here is where the user specifies the rate of speech, which ASCII subgroups are to be spoken, whether speech shall be in character, words, or lines, and so forth.

Host mode. Information typed on the keyboard is sent to the host computer. Information sent by the host to the user is spoken in the manner specified in the format mode.

Buffer mode. The buffer is a temporary storage area through which all information coming from the host passes, scrolling in the same manner as a video terminal. In buffer mode, users may examine the current buffer contents at their own pace, as many times as desired.

Local mode. Used for demonstration and training purposes; simulates host mode operation.

Equipping Your Computer with the Orator

The equipment you will need to use the Orator depends on what you already have. The necessary components are the Orator software, a synthesizer, and a terminal. If you currently own a synthesizer and a terminal and are running under UNIX, CP/M, or most DEC operating systems, all you need is a binary tape of the Orator software. Otherwise, you will need the Orator Unit, which consists of the Orator software and a synthesizer controlled by a Z-80 microprocessor, and a keyboard or terminal. The Orator software, unit, and keyboard are all available separately.

Interfacing

The Orator Unit has standard RS232C interfacing, and will only communicate with asynchronous serial ports. There is a special controller available that can be used to adapt equipment that is not RS232C compatible. A series of switches allows the user to set the Orator's baud rate, duplicity, and parity to be compatible with the host computer.

Through the addition of a special graphics board and a monitor, the Orator can also produce large print of various sizes. People with various levels of visual impairment as well as those with normal vision can alter the device to meet their own needs. A large print/Orator combination may be ordered at the time of initial purchase, or the Orator can be upgraded within a year after delivery.

Hardware

- Speech synthesizer
- Z-80 microprocessor
- 16K RAM for buffer and buffer memory in other uses
- 32K ROM/PROM for storage of software
- Keyboard
- Speaker
- Interface board
- Standard keyboard connector
- Standard modem connector
- Graphics board (for large print)
- Standard television monitor connector (for large print)
- Monitor (for large print)

For more information on the Orator and ARTS® Computer Products, Inc., 80 Boylston Street, Suite 1260, Boston, MA 02116; (617) 482-8248.

The Orator currently is relatively expensive—$8,790 without the large print unit. However, ARTS® is now negotiating with three major companies to develop software products for the talking computer, which should help drop the price.

COMPUTER ADAPTATIONS FOR BRAILLE AND FOR BILINGUAL

John L. Niemeyer, Executive Director
Iowa Occupational Information Coordinating Committee

Overview

In establishing the policies and standards on Statewide Career Information Delivery Systems, the National Occupational Information Coordinating Committee emphasized that each system should deliver occupational and educational information that is appropriate to the widest possible range of user groups preparing to enter the labor force. These groups should include the disadvantaged, handicapped persons, the incarcerated, mid-career changers, those considering college training programs, and others.

In progressing toward this goal, the Career Information System of Iowa is expanding its six-year program of providing career information to the educational community by reaching out to adult populations, the handicapped, and others. As much as possible, all those who are in the process of career exploration and decision making should have access to this system.

In meeting this goal of expanded delivery, two populations have critical problems in the use of a career information delivery system, those who have the barriers of blindness and of language.

Adaptations for the Visually Impaired

The Career Information System of Iowa has served the visually impaired and blind community through use of large type and braille delivery modes. The *PROCESS User Handbook* has been reproduced both in large type and in braille by the Instructional Services Center of the Iowa Braille and Sight Saving School. This handbook provides the structured-search access for the career information system and, what I term, front-end exercises to assist the user to understand the terms and implications of the structured-search access questions. The visually impaired or blind person completes the *PROCESS User Handbook*, using either the large type or braille version. The individual then completes the needlesort process and discusses the outcomes with the counselor.

This current delivery mode does not provide for the person to individually explore occupations in depth. However, technological innovations have made feasible computer delivery of comprehensive career information materials to the blind.

The most exciting system is the talking computer. The paper by Peter Duran, president of ARTS Computer Products, Incorporated, discusses this approach.

One thought I would like to share is that synthetic speech is not only available on a mainframe computer system but is into the microcomputer field as well. Peripheral equipment to either Radio Shack TRS-80 or Apple II and III or other microcomputer systems has been developed to provide a

simulated speech capacity. Technological breakthroughs that would provide advanced microcomputer synthetic voice communication are months, not years, away.

I should state at this point that I am not attempting to endorse any product or system. There may be other more efficient and less costly equipment than the ones I mention. However, these products were brought to my attention by the Iowa Commission for the Blind as examples of current technology.

Among alternative approaches to synthetic voice devices are the high-speed braille computer terminals. An example is the Triformation Systems, Inc. LED-120. This terminal prints 120 characters per second and is capable of interfacing with most computer systems. This equipment is a stand-alone, buffered computer terminal printer. It outputs its forty-character braille lines on fanfold, continuous form paper at 180 lines per minute.

Another type of computer terminal is a paperless braille device that displays a twenty-character line, each braille character made up of six dots that protrude or retract silently. The Digicassette from Triformation Systems, Inc. is an example. A plug-in microprocessor controlled interface allows data transmission to and from computers. The speed of transmission can be controlled by the operator.

A comparable delivery mode is the VersaBraille System from Telesensory Systems, Inc. This is an electronic braille information system that records braille in electronic impulses on cassette tape and displays braille on a twenty-character line of electromechanical cells. The VersaBraille System is a reading and writing system and is also an audiotape recorder that can record sound and braille on the same tape, and can provide an index and automatic retrieval system for both braille and audio materials. This technique would be efficient for storage and retrieval of occupational briefs. The VersaBraille System can also interface with a computer.

Finally, a new device can allow the blind to use the printed or computer career information system. The Optacon from Telesensory Systems, Inc. is a compact, portable reading system that gives blind persons independent access to the world of print. The Optacon converts regular print into an enlarged vibrating tactile form. To read with the Optacon, the blind person moves a miniature camera across a line of print with the right hand. The index finger of the left hand is placed on the Optacon's tactile array, which is approximately one and a half inches long and one inch wide. As the camera is moved across the letter the image is simultaneously reproduced on the tactile array by vibrating rods. The reading finger feels the enlarged letter as it passes across the tactile screen. Whatever image is viewed by the camera's lens is thereby felt by the user. This device can be used either with hard copy or directly on a computer terminal scope.

Adaptations for Indochinese

A second major barrier to the use of a career information delivery system is that of language. For the non-English speaking immigrant or refugee, the American labor market is a confusing labyrinth of occupational choices and working conditions. The inability to obtain the occupational, labor market, and educational information needed by the individual to function in this economy places the refugee at a severe disadvantage.

In Iowa, the primary non-English speaking population is Indo-Chinese, composed of Vietnamese and Laotian communities. The only other significant population is Spanish-speaking. However, that community is small and more bilingual than in other regions of the country.

Therefore, our efforts in meeting the needs of Iowa's non-English speaking population concentrate on the Indo-Chinese languages. The Vietnamese language is spoken by the 2300-member Vietnamese and ethnic Chinese community. The Laotian written language is understood by the 4600-member Laotian, Tai Dam, and Hmong communities. Each has a different spoken language. However, only the Laotian written language was taught in the Lao school system.

Another reason for embarking on the translation of career information materials into Laotian and Vietnamese relates to Iowa's participation in the Indo-Chinese refugee resettlement program. Iowa has held a leadership role in the coordination of the resettlement efforts. Governor Robert D. Ray established the Iowa Refugee Service Center in 1975 as the first state resettlement agency in the nation. The center was located in the Iowa Department of Job Service to emphasize the goal of employment for the refugees rather than cash assistance.

With this emphasis on employment, the Iowa SOICC adopted a coordinating role in providing the non-English speaking refugee with the information necessary for job seeking and career decision making activities. Indo-Chinese refugees required occupational information concerning current job opportunities in their own language. Interviewing for a job is difficult enough without adding a lack of basic knowledge of what the job entails. The occupational briefs in the Career Information System of Iowa provide sufficient information to assist in the job search process.

Furthermore, job opportunities for non-English speaking persons are limited. A career ladder must be built, recognizing that, as English proficiency is attained, the occupational choices expand. Coupled with vocational training and further education, the Indo-Chinese refugee can broaden the scope of career opportunities. Career information at the beginning of the resettlement can provide the initiative to explore career alternatives and complete English as a Second Language (ESL) and vocational and educational programs to attain career goals.

In using the translated career information system, the refugee is provided with a copy of the complete *PROCESS User Handbook* in the appropriate language. After completing the questions, the person sorts through the occupations using the needlesort card deck. The number characters that are on the card are commonly taught in both Vietnamese and Laotian and should pose no problem for usage in the sort process. Once the cards have been selected, the individual can read the title and short description in either Vietnamese or Laotian on the reverse side. If further information concerning the selected occupations is needed, the individual can access the occupational briefs that are in numerical order (the Laotian Sanskrit characters do not readily allow for alphabetizing the briefs). The briefs can be examined and the process repeated as needed, with little difference in procedure as compared to the English version.

The occupational briefs can be accessed directly. An index will be included in the *PROCESS User Handbook*. This will be especially useful for reviewing current job openings. The refugee can gain a better understanding of the "American version" of the characteristics of the occupation before selecting or applying for a job.

The Laotian and Vietnamese languages do not readily avail themselves to computer adaptation. The Laotian written language is based on a form of Sanskrit, which was developed in ancient India. To my knowledge, computer software is not capable of processing the Sanskrit characters. The closest to this is the recent development by IBM of computer software utilizing Japanese characters.

The Vietnamese written language utilizes an adaptation of the French alphabet, but the common usage of diacritical marks makes computer usage impossible under normal circumstances.

However, two approaches for the computer delivery of information in the Laotian or Vietnamese languages exist using a mainframe or microcomputer delivery mode.

The National Center for Material and Curriculum Development at the University of Iowa is preparing educational material in the Vietnamese language. The Center employs an Apple II System, utilizing the high resolution graphics mode. The alpha characters are first entered and the diacritical marks then added manually. This is a slow process but does yield a very readable version.

The same process can be utilized, although with much more difficulty, for the Laotian language. Any computer system that has a high resolution graphics capability, such as through the Apple microcomputer or IBM 3279 and 3287 terminals, can provide information for non-English speaking individuals.

A second approach that can allow the use of either the Laotian or Vietnamese language involves the interfacing of a microcomputer with a videodisk. The videodisk can store approximately 54,000 images with instant access using laser search technology. The occupational brief can be photocopied onto the videodisk and displayed as required on the microcomputer screen exactly as on the hard copy. This technique would be more useful in storing and obtaining career information than following through a structured search access process.

In terms of other efforts toward the delivery of career information to non-English speaking persons, the Canadian CHOICES system provides occupational information in both the English and French languages. The Puerto Rico Occupational Information Coordinating Committee has developed a series of selected occupational briefs in the Spanish language.

We hope that the translated versions of the Career Information System of Iowa materials will be of value to any organization or agency that requests them.

PROJECT DISCOVERY

Philip Olive, National Sales Director
Experience Education

Overview

Project Discovery, a guidance-based simulated work career education system, began development in 1971 with assistance from the Special Needs Section of the Iowa Department of Public Instruction. At that time, the project was totally funded by federal monies.

After eight years of development, refinement, and expansion of users, the product is now endorsed by the National Diffusion Network (through state facilitators) and its thirty-seven career packages are now sold to and used by about 1,000 school systems in forty-two states.

Originally it was envisioned that Project Discovery would enable youth in grades seven through ten to try out a wide variety of work activities to identify interests and self-perceived skills and abilities. Youth would begin to identify a career theme and would eventually select tentative vocational or occupational goals. Its users now include CETA clients, adults, and institutions of rehabilitation. It has been adopted by the U.S. Department of Defense for its schools around the world. The thirty-seven packages, at two reading levels, are available for use in rural, inner city, and suburban schools and community colleges.

Project Discovery as an Assessment Tool

Beginning in 1975, Project Discovery began to be used more frequently in settings other than schools. With the assistance and encouragement of Mr. Harry Flad, project director for Diagnostic Assessment Project for Massachusetts, Experience Education began to explore the possibility of using Project Discovery as an assessment tool in addition to its more traditional use for career exploration. Adults often need opportunities for exploration before assessing them to verify vocational choices. This realization resulted in a reevaluation of the exploration process and the identification of a new frame-of-reference called the Qualifications Profile. Exploration has both a content and a process.

The Qualifications Profile

The Qualifications Profile (QP) orientation offers an approach to structuring the content of both exploration and assessment. The AP, which helps to identify the descriptors that operationally define both the vocational self and the world-of-work, results from a systematic study of the worker in relationship to a job.

Vocational evaluation involves a process of approximating the "goodness of fit" between the individual and a group of occupations. The Qualifications Profile provides a useful frame of references for information gathering and processing; and for occupational decision making during both the exploration and assessment stages of vocational evaluation.

The need existed to develop Qualifications Profiles for each Project Discovery package. In 1978, Experience Education contracted Dr. Clement J. Berwitz, a leading occupational analyst, to perform job analysis on each package and to generate a QP for each activity in each package. The results of this project are now available in the form of the *Project Discovery Vocational Evaluation Manual.*

This manual is designed to be a practical guide in how to use Project Discovery as a resource in both exploration and assessment. The approach to using the system is flexible to allow each user to fit the resource into a variety of vocational evaluation models. Work performance benchmarks have been identified for the tasks in each package. The benchmarks have been organized into a work performance checklist that can be used by an evaluator while working with a client. Also provided is a color-coded wall chart that categorizes the Qualifications Profile information by package for easy reference during evaluation.

The Project Discovery approach exemplifies the belief that vocational evaluation is a process where skilled professionals use a variety of resources to help clients identify and verify occupational or vocational goals. It is a high quality vocational evaluation resource.

For more information on available materials and kits, write to Project Discovery, Experience Education, 401 Reed Street, Red Oak, Iowa 51566, or call 1-800-831-5886.

SEARCH
(Systems Exploration and Research for Career Help)

Ivan Wells
U.S. Employment Service

Overview

My concern is not so much with the delivery of a system, but with what goes into that system. If I were to devise a career guidance system, I would of course want to include information about jobs and training.

From what I have seen at this conference, the several systems presented could (with minimal adaptation) be integrated into what we in the public employment service (your labor exchange) could use with our clients. It would be much easier for all of us if a body with national influence (NOICC) would select and enforce the use of standardized job/training codes and titles.

I might suggest that any coding system allow for some type of crosswalk to the Government Office of Employment (GOE) work groups of USES. While this document does not yet contain all needed items, we in the U.S. Department of Labor are attempting to provide a series of related publications for occupational information. They are as follows:

1) *Dictionary of Occupational Titles* (DOT) 4th edition, with occupational group arrangement and D.P.T. arrangements.
2) *Selected characteristics of the DOT*, specifying: (a) GED (math and language), (b) SVP, (c) physical demands, and (d) working conditions.
3) *Bridge to the World of Work*, which addresses: (a) work values, (b) leisure activities, (c) home activities, (d) work experiences, (e) education and training, and (f) military specialties.
4) *Occupational Aptitude Pattern Structure–1980*, which effectively clusters all the information in the publications listed above.

However, it is my opinion that something is still missing. If I were to refer a person to a job (or a training program) and I did not take into consideration the "real" person, I would be doing that individual a gross disservice. For over forty years the USES has been *continually* refining and developing *specific* job-related norms with the GATB. At this moment, in thirty-five states, more than 137 individuals are carrying out occupational test development programs. Why not take advantage of this experience and attempt to measure the specific potentials of clients?

If you can measure the aptitudes and vocational interests in a standardized and valid way as part of the vocational exploration process, and use CIDS (by any name) to present occupational information, you could have *one* terrific system.

Why doesn't someone develop such a *complete* system? – someone has! For over a decade now a system containing all this good stuff has been evolving in Oregon. It is called SEARCH (Systems Exploration and Research for Career Help).

SEARCH uses the following materials:

1. *General Aptitude Test Battery (GATB)*
   U.S. Department of Labor extensively validated test.
   State employment services control release.

2. *Worker Trait Group Inventory (WTGI)*
   An interest inventory designed for use with SEARCH. 10 for $1.50

3. *SEARCH Computer Printouts*
   Copyrighted and registered computer program used in five sites.

4. *Worker Trait Group Career Guides Book*
   Information about each of the 114 Worker Trait Groups. Specially written for use with SEARCH and based on the Dictionary of Occupational Titles, 3rd and 4th editions. $9.00

5. *SEARCH Counselor Guides, IA, IIA, IIIA*
   Contains scripts and information for directing individuals and groups through SEARCH. $1.80

6. *Guide to the Use of the Worker Trait Groups I-B*
   Participants' self-study guide for use in place of a group presentation. $2.50

7. *Guide to Exploring Occupations Within WIG's–A List of OAPs*
   A list of sample jobs by WTG and OAP, participant use. $1.40

8. *Oregon Occupational Information*
   A supplement of labor market information for each WTG. May be developed for particular states, districts, or standard metropolitan statistical areas. $4.00

9. *SEARCH IV*
   A guide and workbook for planning and carrying out a job search. $2.25

10. *SEARCH Review Packet*
    Includes items two through nine of this list and other information including a binder. $25.00

SEARCH is a counselor guided process designed to help individuals discover an occupational fit. The process includes making career decisions and finding a job. It provides occupational information on the participant's options. The participant is the decision maker and controls the process. SEARCH is applicable to schools, colleges, and agencies in urban and rural settings. A partial listing of the clientele that can be served by SEARCH includes the following:

- Institutionalized adult mentally retarded
- Corrections
- Mobility within state agencies
- Students (in school)
- Out-of-school youth

- CETA
- Reentry into world of work
- Employment service clients
- Career changers
- Indo-Chinese refugees
- Displaced homemakers

The SEARCH process starts with the GATB and can also integrate aptitudes as measured by NATB and BEAG. Participants' aptitudes and interests are matched on two computer printouts: a long form for the counselor, and a short form for the student.

The participant reviews worker trait group career guides to select key groups. A worksheet helps to identify key work groups and provides a worker trait profile of the participant.

Information on the 1,200 most available jobs is available to the participant as well as the *Guide for Occupational Exploration Work Groups*, interests as measured by the USES, 1981, *Interest Inventory* (modified and expanded), *Bridge to the World of Work*, labor market information, and information developed for and by SOICCs.

The participant analyzes, explores, and identifies specific jobs for research. Further analysis provides values clarification. Additional counselor guided information assists in making a realistic appraisal of job opportunities. The participant finds a career job.

For further information on SEARCH, contact Paul E. Kerr, assistant administrator, Employment Service, Oregon State Employment Division, 875 Union Street N.E., Salem, Oregon 97311.

SECTION V

MIX AND MATCH– COMBINING ALTERNATIVES

THE ALTERNATIVES USED IN IOWA

Roger Foelske, Director
Iowa Career Information Delivery System

Overview

Iowa employs many alternatives to deliver the same information. The state is not in the hardware business, and the single objective of their Career Information Delivery System is to dispense information—in all available forms: hard-copy materials, needlesort, microfiche, microcomputers, and mainframe computers. The Iowa CIDS has money in the form of a block grant that is used to provide the most appropriate accessing strategy for each institution.

We use large quantities of needlesort kits, which we find especially good in working with small groups and individuals. The needlesort system is predominant in Iowa's many rural areas. We also find it effective and easy to use an an inservice strategy.

We began using microcomputers as part of our delivery system because so many were already available in institutions throughout the state. We are now buying additional microcomputers at low cost. The fact that micros involve no telephone line costs is seen as an advantage over delivery through a mainframe.

We do, however, continue to provide information through mainframes. Iowa is not in the equipment business. We are pledged to provide the best possible services by means of all existing systems. Mainframe data are updated once each year, and that data base is applied to all methods of delivery—microfiche, needlesort, printed materials, and microcomputer programs. Users are required to effect the update. The same material is contained in all modes to achieve appropriate delivery of career information materials in a variety of situations.

THE INTERFACE OF ALTERNATIVES WITHIN THE COLORADO CAREER INFORMATION SYSTEM

Mary Lou Aberle, Research and Development Analyst
Colorado Career Information System

Overview

Colorado is the eighth largest state in area with a population close to two and three-fourths million residents. Approximately half of these are located in the metropolitan area of Denver; the other half are spread throughout the state. The Rocky Mountains separate the eastern and western slope areas, making interstate and communications more difficult and expensive than in other states.

There is a large rural population in Colorado, located along miles of connecting county roads. Individuals located in these areas have limited accessibility to technological advances. They have difficulty generating the revenue necessary to fund services that are being provided to metro residents who have larger tax bases.

The Colorado Career Information System (COCIS) is housed at the University of Colorado. It is governed by a board of directors composed of state agency representatives appointed by the governor. Currently, it approximates a private, not-for-profit agency that is neither under the jurisdiction of the University nor of the state. Since termination of the U.S. Department of Labor grant and federal funding one and a half years ago, research has been conducted on several planes to determine the most appropriate alliance for COCIS. To date, no decision has been reached on this matter.

COCIS is a direct descendant of the Oregon system. Oregon, and two other career information systems used in Colorado, were initially modified, resulting in the development of COCIS. Information is delivered via two modes: COMPUTERSORT and CAREERSORT.

1. COMPUTERSORT is the computer-based format that provides electronic storage, search, and presentation of occupational information.
2. The CAREERSORT version employs a manual card and needlesorting process in conjunction with information supplied in two volumes.

These modes are identical in many respects. Both contain the following nine information files: (1) Occupations, (2) Programs of Education and Training, (3) Employers, (4) Job Search Skills, (5) Financial Aid, (6) Schools, (7) College Majors, (8) Apprenticeships, and (9) Physical Demands. The information is accessed directly or by answering the QUEST questionnaire and identifying occupations that satisfy specific individual requirements. Either mode may be leased on an annual basis. Both are used by a variety of user sites including schools, libraries, women's centers, WIN, and CETA programs.

COCIS owns two computers that deliver to Denver metro and Southern Colorado users. In addition, there are three service bureaus that provide COCIS to other areas of the state. Approximately 60 percent of COCIS sites use COMPUTERSORT and 40 percent use CAREERSORT.

One major difference between these delivery modes is the fact that information is updated for the manual system once each year, when revised volume pages are sent to users and they return outdated pages. However, the computerized system is updated on a quarterly basis.

Three developmental projects have been under way for the past six months that will change the complexion of COMPUTERSORT and CAREERSORT:

1. Colorado is a pioneer in making the conversion to the Standard Occupational Classification (SOC) system. A great deal of time, energy, and research has resulted in specific criteria used to select the 320 SOC occupations from the total 640; these will comprise the revised Colorado Career Information System.
2. The Colorado system is being written in a new computer language, COBOL, which will be compatible with many more computers in the state.
3. Research is being conducted to determine if another accessing strategy is desired for the fall of 1981.

Rationale for Selection of Delivery Modes

The evolution of the COCIS delivery modes over the past six years was not without growing pains. COMPUTERSORT was the first priority in system development. Colorado already had two computerized career information systems operational in the state. Testing in Colorado of the Oregon system demonstrated its ability to meet most of the occupational information needs of users. U.S. Department of Labor funding ensured that the best elements of these three systems could be combined into a unique Colorado career information system.

Rationale for computer delivery was also based on a proposed statewide teleprocessing network that would take COCIS to every major county in Colorado.

There was no doubt that a manual system was necessary to provide career information to small schools and agencies and rural communities. A self-assessment questionnaire and occupational card sort access strategy were decided upon. But surveys of potential users, conducted at the time, provided conflicting information on the best format for the printed materials. Those who owned microfiche readers preferred fiche; others wanted hard copy in book form because they had no microfiche readers.

The State Board for Community Colleges and Occupational Education owned a microfiche occupational information system, VIEW, which became merged into COCIS. Great pains were taken to reduce the reading level of the VIEW material to that of sixth grade level.

Thus, two manual systems were operational. Both used a card deck and needle for sorting occupations based upon a self-assessment questionnaire. With the card deck, the user received printed information either on microfiche or in book form. The costs for each were comparable.

The microfiche format was ill-fated and doomed to a speedy death for several reasons:

1. Many schools and agencies did not have the proper equipment for reading microfiche. Those that had microfiche readers did not have printers on their equipment, so it was not possible for users to receive hard copy printouts, a requirement for Occupational Information System funding. Photocopying the fiche information for users was too expensive for schools and agencies to absorb.

2. The reading level of the microfiche materials was not appealing to many educators and students.

3. The management of what amounted to two delivery systems and one computer system all at the same time was difficult for an emerging agency to coordinate.

4. Actual sales of the microfiche version were limited and renewals were few. Colorado users did not like the microfiche option.

Therefore, it was determined that the computer version of COCIS would be marketed to metro areas of the state. The cardsort deck and accompanying volumes comprised the manual version available to the more rural parts of the state.

Policy Decisions Affecting Delivery Modes

Colorado conducted an extensive study of available national systems at the beginning of grant funding by the U.S. Department of Labor. Some systems were eliminated because they provided information primarily for college students, ruling them out for delivery to high school populations. Others were rejected due to proprietary problems and lack of capability to modify them to meet OIS guidelines.

Colorado chose the Occupational Information Access System from Oregon; the Colorado Computerized Vocational System; and the Colorado Vocational Information for Employment and Work System, for modification into the present-day COCIS. The following three criteria were priorities in this modification:

1. Revision to meet OIS guidelines
2. Addition of an appropriate accessing strategy
3. Reflection of localized information

Originally it was believed that the state legislature of Colorado would allocate funds for the development of a state teleprocessing network, which would link each county seat in Colorado by computer with the state capitol complex in Denver. COCIS was to be delivered to each county over this network and "drop lines" purchased for delivery to local school districts and agencies within each county. In addition, the Boulder Schools' computer was to deliver locally via the Denver Metropolitan commercial exchange to Denver/Boulder metro user sites.

When the legislature failed to appropriate funds for the teleprocessing network, COCIS was compelled to assume responsibility for computer delivery to the entire state. COCIS contracted with a computer time-sharing brokerage firm for Denver metro delivery.

A project was initiated that involved the use of multiplexers and purchase of a long-distance telephone line across the mountains to the COCIS computer. When long distance phone rates from one user site for one month totaled $1,000, all parties involved realized the expense was prohibitive to continuing in this fashion.

Additional problems arose when demands on the brokerage firm computer caused limited access and continual inaccessibility due to "down times." COCIS also lost a degree of control over updates and usage. Thus, COCIS administrators made the decision to purchase a minicomputer (a DEC PDP-11), to deliver within the Denver-metro region.

COCIS was successful in negotiating with bureaus owning other computers to deliver in the northern and southern areas of the eastern slope. This left the western slope without computer delivery. Again, the decision was made to purchase another PDP-11 minicomputer to service this part of the state. A state-owned computer was later installed at this site. COCIS decided to transport the minicomputer to another location needing computer delivery.

The Interface of COCIS' Delivery Modes

COMPUTERSORT and CAREERSORT interface well with one another. They use the same data base, accessing strategy, and universal pricing policy. The manual system is a duplication of that which is done automatically by the computer.

Delivery Modes Meet Varied Needs

COMPUTERSORT meets the needs of large schools and agencies with adequate funding resources. It provides them with a speedy, motivational tool, capable of serving 100–200 users per month per site. An estimated 100,000 Colorado residents utilize COMPUTERSORT annually.

CAREERSORT, which costs considerably less than the computer version, is preferable for many small, rural agencies and school districts. They may not have the user base, accessibility to computer delivery, or adequate funds for rental of COMPUTERSORT.

The manual system has been proven to be an effective decision-making tool for junior-high-age students and the mentally retarded. The sight of occupations being eliminated from the card deck as a result of their answers to the QUEST questionnaire is a visual, graphic representation for these individuals. Its portability makes it attractive in schools, libraries, and agencies where it can be used with groups or sent home with individuals.

The technology of the computer continues to be a source of fascination to high school and college students and to the adult population. "Interacting with the computer gives me a sense of self-confidence that I can do anything," one handicapped user stated.

COCIS is now conducting research on one of its immediate priorities—whether or not to make the system available for microprocessor delivery. The information obtained to date shows that many of the smallest, rural schools in Colorado are utilizing microcomputers that may prove to be more motivational than the card-sorting system.

THE VARIOUS DELIVERY ALTERNATIVES OF THE GEORGIA CAREER INFORMATION SYSTEM

Les Janis, Director
Georgia Career Information System

There is an increasing need and desire among school and agency counselors and career educators in Georgia for accurate, reliable, and current occupational and educational information. The Georgia Career Information System (GCIS) responds to this need by developing, maintaining, and delivering career information in a readable format. Additionally, GCIS provides assistance to user agencies, schools, and institutions through training and supportive materials to encourage effective integration of the system into instructional and counseling programs.

GCIS Objectives

As GCIS continues its efforts to make the system available to the citizens of Georgia, two primary objectives are considered—providing low-cost, high-quality career information, and delivering that information by methods most advantageous to the user.

High-quality information is the key to developing a good career information system. Quality information alone, however, will not ensure the use of the system by a large number of people throughout the state. Current and potential users of GCIS want the information delivered at a reasonable cost and by methods that meet their needs. GCIS responds to this need by disseminating the information by computer terminals, needlesort decks, softbound books, and microfiche.

The Georgia Career Information System, located at Georgia State University, uses the University's Univac 90/80 computer to update and disseminate career information. The GSU Computer Center connects with the University System Computer Network, an organization of colleges and universities throughout the state. The network provides computer access via telecommunications to member institutions as well as to private educational institutions and other state agencies.

Computer Delivery

Most user sites that choose computer delivery access the system by computer terminals telephonically connected with the Georgia State University computer. In addition, computer delivery is provided to all twenty-three high schools in the Atlanta City School System by remote access to the school system's IBM 3031 computer. The Atlanta Schools' computer center receives computer tapes on a regular basis to ensure continuous availability of up-to-date information.

Computer delivery of GCIS offers several advantages. Since the information is updated daily, computer users have access to the most current information; the computer terminal is fun and easy to use; and the users can take their printouts with them.

Although computer delivery has its distinct advantages, it is considerably more expensive than other methods of delivery. User institutions must pay for computer time, terminals, terminal paper, and telephone costs. Additionally, Georgia is a geographically large state with a significant rural population. Computer delivery in many local calling areas is not currently available, making long distance telephone access to a central computer an additional expense.

The needlesort system is a relatively inexpensive alternative to the computer for providing career information. The search strategy into the system can be used by both the needlesort and computer delivery methods. The needlesort system contains a deck of cards. Each card is coded for the attributes of an occupation by a series of holes and notches located around the perimeter of the card. By inserting a needle through the holes and notches that correspond to their answers to a questionnaire, users can sort the set of cards and obtain a subset of cards (occupations) that indicate their preferences.

The user refers to microfiche or soft-bound books for printed copies of the information files. The microfiche and books are printed from the computer files to maintain consistent and compatible information between the various delivery methods.

Besides being less expensive than computer delivery, the needlesort system has the advantage of being very portable and highly graphic. Computer delivery sites in Georgia are beginning to use the needlesort as an additional and supplementary delivery method.

Microcomputers

A recent, informal microcomputer survey was conducted by the Georgia State Department of Education and other agency personnel. This survey indicated that there was a large number of microcomputers in Georgia schools and that the Apple and Radio Shack brands predominate. Because of the growing number of microcomputers in Georgia, GCIS plans to deliver a search strategy into the system using microcomputers. Users will be referred to the soft-bound books and microfiche for occupational and educational information.

Microcomputers are rapidly increasing in power and memory, and their cost is relatively low. They have many advantages similar to those of larger computers. Anticipating the widespread use of microcomputers in Georgia that are capable of delivering the entire system, GCIS looks forward to the opportunity of delivering career information by this exciting technological alternative.

Whatever method(s) of delivery a user institution might choose, the Georgia Career Information System will continue to provide quality occupational and educational information through ways that meet effectively the needs of its users.

DELIVERY TECHNOLOGIES IN THE OREGON CAREER INFORMATION SYSTEM

Fred Beisse, Manager
Delivery Systems, Oregon CIS

Overview

The Oregon Career Information System (CIS) offers a variety of delivery systems to meet the needs of end users. A variety of systems is desirable because needs differ from user to user and from site to site.[1] The purpose of this paper is to describe the delivery system alternatives available in Oregon, and to say something about the application of these alternatives in various user environments.

By focusing on career information delivery systems, one should not forget that delivery systems are only the vehicle for transmitting information. No delivery system, no matter how easy to use nor how sophisticated, can compensate for poor quality information. To be useful to a person making career or educational plans, information must be responsive to the needs of the end user: it must be accurate and up-to-date; it must be presented at the comprehension level of the target population; it must apply to the geographic area of interest to the user; and it must be integrated into a career and educational planning program by people who are trained in the use of the information.[2,3] To this list, one can add that information must be delivered in an attractive, usable, and cost-effective manner. While information is the heart of any system, it is the information delivery technologies that are of primary interest in this paper.

Description of Delivery Systems

Four delivery systems are available to school and social agencies that are part of the Oregon Career Information System.

Books of occupational and educational information are published in the fall of each year. Since occupational information changes most rapidly, updated occupation books are also distributed in the spring.

Needlesort kits combine books with needlesort cards. The cards use an occupational search strategy, QUEST, which is educational in itself, and serves to guide users into the occupational and educational books for further exploration.[4]

Computer terminals are the on-line counterparts of the needlesort kits. Computer delivery combines both the QUEST search strategy and information files into one delivery system that is accessed from a printing terminal connected to a time-shared computer.

Microcomputers are the most recent delivery technology. While they are, of course, related to their predecessors, delivery of career information on microcomputers poses unique opportunities and challenges. And they have the potential to provide information delivery to users who have not previously been well-served by other delivery systems.

While the Oregon CIS has implemented all four of these delivery systems, other CIS states choose those that fit the needs of users in their state. Some, such as California, initiated service in their states with computer terminals; others (Nebraska is an example) started with needlesort kits. Still others began with books. Most have diversified.

Books

Oregon CIS publishes three kinds of books. The occupational information books are published in seven editions that correspond to economic and geographic areas in Oregon for which occupational information is maintained. These books contain descriptions of an occupation's duties and purpose, aptitudes of workers, working conditions of employees, the supply-demand outlook for entrants into the occupation, average beginning wages, and how to prepare for entry into the occupation. Over 95 percent of the state's jobs are covered in about 250 occupational categories in the Occupational Information books.

The Programs of Study book describes program objectives, subject matter, and instructional methods for various fields of education and training. School books present data on services, characteristics, and costs of about 200 two- and four-year and proprietary postsecondary education institutions.

These books are designed to guide users in a natural progression from information on occupations to ways to prepare for them, and then to programs of study, and finally to school information. They satisfy a demand for reference materials in libraries, by employment program planners, by job counselors, and as one of the information resources in two other delivery systems. A complete set of books costs about $50 to produce.

Needlesort Kits

There is one card in a needlesort deck for each of the occupations in the CIS system. The cards are punched in such a way that they fall off a needle whenever a user's response to a QUEST question is inconsistent with an occupation's attributes. The cards are printed with the occupation's title, a brief description of typical duties and purpose, and an occupation code number which is used like a page number to find further information in the books.[5]

The needlesort kits are used in conjunction with a User's Handbook that describes the CIS system, lists the QUEST questions, instructs users on techniques for using the needlesort cards, and helps guide users into the information books.[6]

The needlesort system can be thought of as a manual computer. It is popular where, for reasons of cost or logistics, a computer terminal is not practical. But the needlesort has many advantages over computer delivery systems, including cost, portability, flexibility, and the visual impact of occupational decisions. In quantity, needlesort kits can be produced for about $90, including the card decks and books.

Computer Terminals

The computer programs that comprise the on-line delivery system are written primarily in BASIC and FORTRAN languages so that they are easily transported onto a variety of computer systems.[7] These computers are accessed by standard printing terminals, which are usually connected to a computer by a telephone dial-up device. The programs are very interactive, include a variety of user assistance messages, and are designed to anticipate the kinds of problems first-time users are likely to encounter. Users of the computer version of CIS also get a user's handbook that provides information for computer users parallel to that found in the needlesort user's handbook.[6]

The computer programs in CIS include utility programs to maintain the information files, to facilitate transfer of information files from one computer to another, and to print the information books. The information files in Oregon occupy between 5 and 6 million characters of computer disk storage. Magnetic tapes with updated information files are distributed every two months during the school year to fourteen host computers that run the Career Information System.

The cost of computer delivery ranges from $2.00 to $4.50 per user hour, depending on the rates charged for computer use. Rates tend to be lowest at installations that offer unlimited computer time for an annual, fixed fee that permits a user site to dial-up the computer as needed. It is the policy of Oregon CIS to deliver the computer programs and information files on several computer systems in the state in order to reduce the costs of telephone access. In some cases, Oregon CIS purchases computer time, arranges for telephone service, and leases terminals that are then supplied in a package directly to end user agencies. This service relieves both host computer centers and user agencies of many administrative and technical details they prefer to leave to others.

Microcomputers

As the most recent of the CIS delivery systems, the microcomputer version is still considered a research and development project. The first phase of the project implemented the QUEST occupational search strategy. The micro-QUEST program is operational and is undergoing field tests. Like the needlesort technology, micro-QUEST relies on books for information delivery. And micro-QUEST is obviously similar to the computer delivery system because it is highly interactive, and guides the user from activity to activity.

Among the design objectives of the micro-QUEST project was to take advantage of the display screen technology on microcomputer systems. Micro-QUEST is more interactive than other computer implementations, since the slow speed of a printing terminal is not a constraining factor in the number and kinds of messages to the user. Another objective was to facilitate a user's transition from the microcomputer to the information books. This is no small task, since earlier field tests had indicated user reluctance to move from a very attractive delivery system (computers) toward a more mundane one (printed materials).

Micro-QUEST runs on an Apple II microcomputer with 48K of memory, display screen, and one or two floppy disk drives. An eighty-column printer is highly desirable. The programs are written in Applesoft BASIC, and a Radio Shack TRS-80 version in level 2 BASIC is planned. Also planned in phase 2 of the microcomputer project is a full-feature implementation of CIS that will access all CIS information files stored on a hard disk system.

A user's handbook accompanies the microcomputer version. It is patterned after user's handbooks for other delivery systems, and includes materials to help users of micro-QUEST retain an occupational exploration list if they are working on a microcomputer without a printer.

The microcomputer version of QUEST is a new enough delivery system that there are not yet reliable, historical cost data. After the field test, micro-QUEST will be marketed in Oregon for about $350 per user site, with some discount for multiple copies at one site. That price includes a set of information books and other user materials, and provides for some recovery of the development costs of the microcomputer project.

In the above description of the four CIS delivery alternatives in Oregon, the costs are for the delivery system exclusive of information development, training, and other user services costs. Since these latter costs are independent of which delivery system is used, they are isolated in an annual per user fee, which ranges from $2.00 per user to less than $1.00, depending on the number of users served by an agency.

Evaluating the Alternatives

Which of the alternative delivery systems is in use at a stie depends to some extent on the interests, experiences, and traditions of the staff, and of course, on such things as the size of the budget available to support career planning and vocational education tools like CIS. In a recent informal survey of a sample of user sites in Oregon, the following distribution of systems was reported.

Delivery System	*Percentage*
Needlesort kits	37
Computer terminals	40
Both needlesorts and terminals	23

Delivery systems are definitely not mutually exclusive, and in a quarter of the sites, both computer and manual systems are found. This finding is not by accident, since one of the original policy and design objectives of the Oregon Career Information System was that both the QUEST access strategy and the information files be available in on-line and manual versions.

What are the characteristics of delivery systems that lend themselves to use in various user environments? Each delivery system has distinctive advantages and disadvantages, which accounts for the decision to offer more than one delivery alternative in Oregon.[2]

There are several characteristics that should be common to all career information delivery systems.[8] These include:

1. Provides quality information and facilities in use
2. Convenient to operate, and operable by an untrained user
3. Attractive to users; encourages re-use
4. Printed material for subsequent study is available
5. Easily integrated with traditional guidance and employment development functions; minimal training time for professional staff
6. Encourages instructional, as well as guidance use

To this list should be added the characteristic that, where alternative delivery systems are available, they should be consistent with each other. The results a user gets from the search strategy and the information facts should be independent of the delivery system. Consistency can be maintained where both automated and manual systems are an integral operation of state CIS systems.

The Needlesort Kit Alternative

The combination of needlesort cards and information books as a delivery system offers several advantages. One of the principal ones is the visual nature of sorting the occupation cards manually. Users can immediately see the consequences of their QUEST response decisions. Those occupations that fall off at each step can be reviewed as part of the inquiry or learning process. Many kinds of instructional activities are possible with the needlesort, since the user is an active participant in the sorting process.[9] While it is difficult to get a group of users around a terminal, the needlesort has been found to be useful in small group activities. Since the printing speed of a terminal is slow, the information books tend to permit quicker user access to the information files.

The needlesort/information book combination offers agencies with limited resources the lowest cost delivery alternative available (considering both initial cost and operating cost). The manual system is the most portable of the alternatives, which promotes sharing within a site and permits student or client use at home. The needlesort kit is the system of choice where there is intensive counseling. In vocational rehabilitation, for example, counselors can work with clients to motivate them to take maximum advantage of the system's flexibility.[9]

The primary disadvantage of the needlesort/information book delivery system is that the user does not carry away the information for further study, unless a copying machine is provided, or arrangements can be made to borrow the books. With the needlesort cards, it is not as easy to learn all of the reasons (responses) why an occupation dropped off the user's list of potential occupations. Some users find the card deck bulky. And for others, the needlesort is just not as appealing as the computer.

A recent study of the needlesort alternative by the North Dakota Occupational Information Coordinating Committee concludes, 'like many other guidance, counseling, or career education tools, the needlesort structured search is a valuable learning device, which has some definite advantages over other methods, just as it has some disadvantages." Based on data from South Dakota, Wyoming, Nebraska, and Iowa, the report found that where current information was maintained, where needlesort decks were up-to-date and in good repair, and where adequate staff training was provided, "the needlesort structured search is an efficient, effective, and popular tool."[10]

The Computer Terminal Alternative

The computer terminal is an attractive delivery system, largely because of the basic appeal of working with a computer.[1] Most users find working with the terminal an interesting experience, although some are initially hesitant about using computer equipment. Recent experiences working with disadvantaged youth in Oregon suggest that this target population is not motivated to use the information in books, but will readily work with the CIS system if a computer terminal is available.

To a state CIS, the computer delivery system poses a substantial advantage over any other means of file maintenance, since it permits continuous updating of information files. This is a special advantage where information is delivered on one central computer system instead of a distributed network to which update tapes must be sent.

The computer delivery system is a complete package, which involves end users in both an access strategy and the information files without requiring a transition between media. This characteristic, plus the ability to carry away individualized printed information to a counselor or to family members and friends for further discussion and exploration, is perhaps the most significant advantage of

the computer delivery system over the needlesort. Because information is displayed in the order requested by the user, the computer version of CIS encourages more comparison of information and alternatives.

Computer delivery of career information has some notable disadvantages. Its higher costs (initial and operating) mean that low budget or very small schools and agencies face considerable costs, especially where long-distance telephone charges result from connection to a computer from a remote location. Generally, computer users need more user services and troubleshooting assistance, since there are more things that can go wrong between the delivery source (computer) and the end user.

Other disadvantages of computer delivery for some groups include the hesitancy factor in working with a computer, as well as the tendency for some users to view the computer as an authority figure. Finally, computer terminals may be inappropriate in environments where the operating noise is disruptive.

Why (Not) Both Systems?

Since each of the systems has its relative advantages and disadvantages, it is not surprising that so many sites in Oregon have two delivery systems available. Flexibility of information delivery to users with different needs argues for the availability of both systems at a site. And, when the computer terminal is out for repair, or when the computer goes down, it is reassuring to both counselor and client to have a needlesort deck and books as a backup.

The Microcomputer Alternative

There are more reasons to implement a career information delivery system on a microcomputer than its current popularity in schools and social agencies; that popularity is only one reason. There is a recent trend in Oregon for educational service districts to question the long-term economics of providing time-shared minicomputer services to local schools and districts. The microcomputer is a significant factor in their review of the role of large time-shared computers. If threatened budget reductions occur, a microcomputer may be the only computer delivery system available in some local schools and districts in the future. This displacement was not an objective, nor an anticipated, consequence of the microcomputer project at CIS. In fact, micro-QUEST was not designed to compete with either needlesort kits or computer terminals, but to offer another alternative delivery sytem to supplement its predecessors.

The microcomputer has the potential to combine some of the strengths of the other delivery systems. Purchase of a microcomputer is roughly comparable to the annual cost of leasing a terminal and paying to access a time-shared computer. So initial costs of microcomputer delivery are comparable to computer delivery; however, operating costs in subsequent years approach the cost of needlesort delivery.

Since many microcomputers include printers as peripheral devices, printed material the user can carry away is easily provided. Not as much material as the computer terminal offers, since the books are still the primary source of information. But at least a printer can generate an occupation list for later study, and it can do a better job of summarizing career decisions for a user than the needlesort accessing strategy.

The display screen speed of the microcomputer improves to the degree to which the user interacts with the computer. The design of the micro-QUEST program includes features for a review of user's QUEST responses, an occupational list that is more closely related to the QUEST responses, an improved feature for inquiring about the attributes of an occupation, and more user help messages on where and how to use the information books. The field tests have pointed to the need for other features that are being considered for inclusion in the micro-QUEST design specification.

The substantial initial cost of a microcomputer system is a disadvantage to agencies that are considering delivery system alternatives. Although, in some environments, other instructional or administrative uses can help distribute the initial cost and justify the purchase of a microcomputer. Furthermore, the microcomputer industry-wide problem of piracy of programs (since the diskettes are easily copied) may create problems of unauthorized use and its consequences for both quality of service and erosion of the financial base of support for the CIS organization in a state.

To these disadvantages of the microcomputer delivery system can be added the intended or unintended destructability of floppy diskettes. Diskette problems with microcomputers may rival terminal problems in computer delivery systems as a drain on user services and troubleshooting resources of CIS state systems.

Finally, since the microcomputer is a relatively new delivery alternative (still in the research and development stage), there remain unanswered questions:

1. If some users are intimidated by the computer terminal, what will be their reaction to the exotic character of the display screen?
2. Can a microcomputer delivery system successfully shed the game-playing image associated with them in both school and home environments?
3. Can users be guided into an easy transition from microcomputer to information books?

The Future of CIS Delivery Systems

It is the policy of the Oregon CIS to continue to promote a variety of delivery system alternatives. The current delivery systems are intended to complement each other by meeting needs that differ among groups of users. So long as the relative advantages and disadvantages of the alternatives are as large as they are today, no delivery system can serve as a replacement for another system, and all will continue to be made available to agencies and end users.

Phase 2 of the CIS microcomputer project will include the development of a microcomputer delivery system that will incorporate hard disk technology to permit the delivery of information files in addition to the QUEST search strategy. It is unlikely that this development will signal the end of the time-shared computer as a delivery system, since the current hardware cost of $7500 to $8500 will be prohibitive to many schools and social agencies. But these hardware costs are expected to drop, making a full-feature microcomputer CIS a worthwhile development investment.

The somewhat longer-term future will undoubtedly see career information delivery as a part of the emerging "view data" technology. This development represents a culmination of several technologies: the large data base storage capacity of time-shared computer systems, the power of the microcomputer to provide personal computing and information processing services, and the delivery capabilities of cable and network television and the telephone system. But that development is still in the crystal ball of career information delivery systems.

Notes

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MAINE'S CHOICE OF ALTERNATIVE CAREER INFORMATION DELIVERY MODES

Dennis E. Fortier, Manager
Maine Occupational Information Coordinating Committee

Overview

Maine has chosen microfiche and complementary hard copy delivery modes to augment its computerized Career Information Delivery System. The decision to develop these alternative delivery mechanisms was based on the realities of the situation in Maine in terms of capitalizing on existing products and resources.

Microfiche

A microfiche system of occupational information had been developed in one of the regional secondary vocational schools through continuing grants from the state's department of educational and cultural services. The equipment to produce the microfiche had been purchased and thus was available. In addition, a relatively good information format for over 1,000 occupations based on the *Dictionary of Occupational Titles* had been developed, utilizing locally produced labor market information as much as possible. What the system lacked, however, was a structured search strategy that allowed users to explore various occupations as a result of search based on interests, aptitudes, work settings, lifestyles, and so forth. The system also lacked support materials, such as user guides, other resource materials, and related items. In essence, however, the base of the microfiche system was developed and the decision was made to incorporate it into our alternative delivery system.

Hard Copy

In conjunction with the microfiche system, a hard copy occupational "brief" type of publication will be developed. Integrating the microfiche with hard copy is now possible due to the availability of word processing equipment. The narrative occupational description from microfiche can be stored through the word processing units, with updating being accomplished in much more timely fashion than before the advent of word processing. Masters for the microfiche can be stored on disk, and can be retrieved quickly. Multiple hard copies of what appears on microfiche can easily be obtained due to the print-ready quality of word processing products.

The development of microfiche and hard copy alternatives was deemed to be sound monetarily because it could be used to provide integrated career information to users who are outside the computerized delivery mode due to geography, location, or both. The alternatives are an inexpensive compromise, though not offering the same overall advantages of the computerized mode.

HOW MANY ALTERNATIVES CAN BE USED IN A STATE?

William Woolley, Executive Director
Florida Center for Career Development Services

Overview

All products used in Florida are a direct result of client needs. The more varied alternatives a system employs, the more funding sources it can maintain. The single important objective in providing career development services is to interact with the users. Florida's policy is to "sell everything," based on evidence that that approach provides the highest degree of user self-sufficiency.

The Secret

Florida's most successful communications tool is its tabloid newspaper, *The Secret*, featuring career success stories, plus information on over 300 occupations, their training programs, and financial aid information. Junior and senior high school students are the main target of the tabloid, but its popularity and circulation are continually increasing among many agencies and private and post-secondary schools.

Florida VIEW

Florida VIEW is a career information system on microfilm, consisting of a deck of career and training cards on over 586 careers and 330 institutions for training.

CHOICES

CHOICES is the Florida version of a computerized career information system originally developed and produced in Canada. CHOICES contains information on over 1100 occupations (more occupations will soon be added), an institution file, and job bank information.

CAPS

The Cooperative Agency Placement System (CAPS) is a computerized system for providing listings of Florida's technical school and community college graduates to more than 15,000 Florida employers.

CAREERLINE

CAREERLINE is a widely publicized toll-free line that any citizen in Florida can call twenty-four hours a day for career and training information.

Newsletter

The Florida Center for Career Development Services publishes a newsletter focused on Florida's industries, the employment needs of those industries, and the center's involvement with them.

Employer Directory

Florida's Employer Directory provides a local or regional listing of employers participating in the CAPS program and their hiring interests. It is also available on microfilm.

Why These Alternatives?

Florida VIEW has been an ongoing program in Florida since 1970. At the time of its inception, it was an innovative approach to deliver localized career information. It is now widely used throughout the state. Florida was the first state to receive CHOICES through a nonfinancial agreement between Florida and Canada. This agreement called for Florida to lend its expertise to Canada to develop alternative delivery systems other than the computer. In turn, Canada provided us with the CHOICES program and their expertise in the area of computerized career information deliveries.

CAPS was originally a pilot program to deliver computerized placement services to people throughout Florida. The evaluation of the system showed enough merit that the programs were purchased from Pennsylvania and installed in Florida as a service to students, school placement offices, and employers.

The Secret, the toll-free career line, the postsecondary directory, and other products and services are all outgrowths of these three basic programs. Center policy decisions relating to the selection of these products and services have been based chiefly on feedback and the evaluations of our users.

How Products Complement Each Other

Originally each alternative was developed as a separate item. But information, staff time, and components of each system are used, interchanged, and modified to fit the need of the other systems. For example, to develop the information needed to assemble the tabloid, *The Secret*, the staff of Florida VIEW along with the data from Florida VIEW were used to compile the career descriptions that went into the development of *The Secret*. Each system is now running on one common data base.

Different Alternatives Meet Different Needs

Florida VIEW serves those schools and agencies that have microfilm capabilities. This system offers comprehensive information at a nominal cost.

CHOICES provides schools and agencies with the option to have on-line interactive capabilities.

CAPS serves those schools and agencies wishing to enhance their ongoing placement programs.

The Secret is addressed to those individuals (and their parents) who receive little or no guidance information. Five hundred thousand copies were distributed last year.

CAREERLINE is available to any resident of Florida. This service provides answers to any questions regarding educational and career information.

FUTURE ALTERNATIVES FOR DELIVERY OF INTERSTATE CAREER INFORMATION

Ron Myren
Wisconsin Career Information System

Overview

The Wisconsin Vocational Studies Center, University of Wisconsin-Madison has received funds from the National Occupational Information Coordinating Committee to develop and test a model system demonstrating the feasibility of sharing information between different computerized occupational information systems. The contract is provided through the Wisconsin Occupational Information Coordinating Council with development organizations consisting of the Wisconsin, Michigan, and Iowa Occupational Information Systems.

Development

For the purpose of transportability the system is being developed on an inexpensive microcomputer that will provide the communication link between the different participating information systems. Every effort is being made to design a product that will demand little user training. The goal is to make the entire interconnection of information systems transparent to a client knowledgeable about at least one of the participating systems. The planned computer software will fully support the client in making requests from an unfamiliar system by determining occupation code numbers that are related by SOC categories and building a search file containing all required systems and program commands together with request codes necessary to complete a search.

Use

Initially, the client will be required to dial the microcomputer directly over standard telephone lines to accomplish the search of a participating system. Having established communication, the client will be asked if the search is to be completed immediatley in which case the microcomputer will directly dial the requested system, or if the search can be completed at some later time to take advantage of reduced communication charges. The client will then be asked to enter the occupation code number for which information is desired. The translator program will determine the SOC category under which this occupation is listed and also all occupations listed by the target system under the same SOC code. If both systems identify the same occupation a direct translation has taken place and the code number of the target system is entered into the search file. If a direct match fails, all occupation titles from the target system located under the SOC category will be asked to select any, all, or none of those listed that satisfy the request. The system will also have provisions for producing a similar list of occupations at either the three-digit and/or two-digit SOC level on demand. This will provide the client with a better understanding of the related occupations that might be available. In all cases the appropriate SOC category titles will be printed in order to assist the client in further searches outside the computerized system.

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